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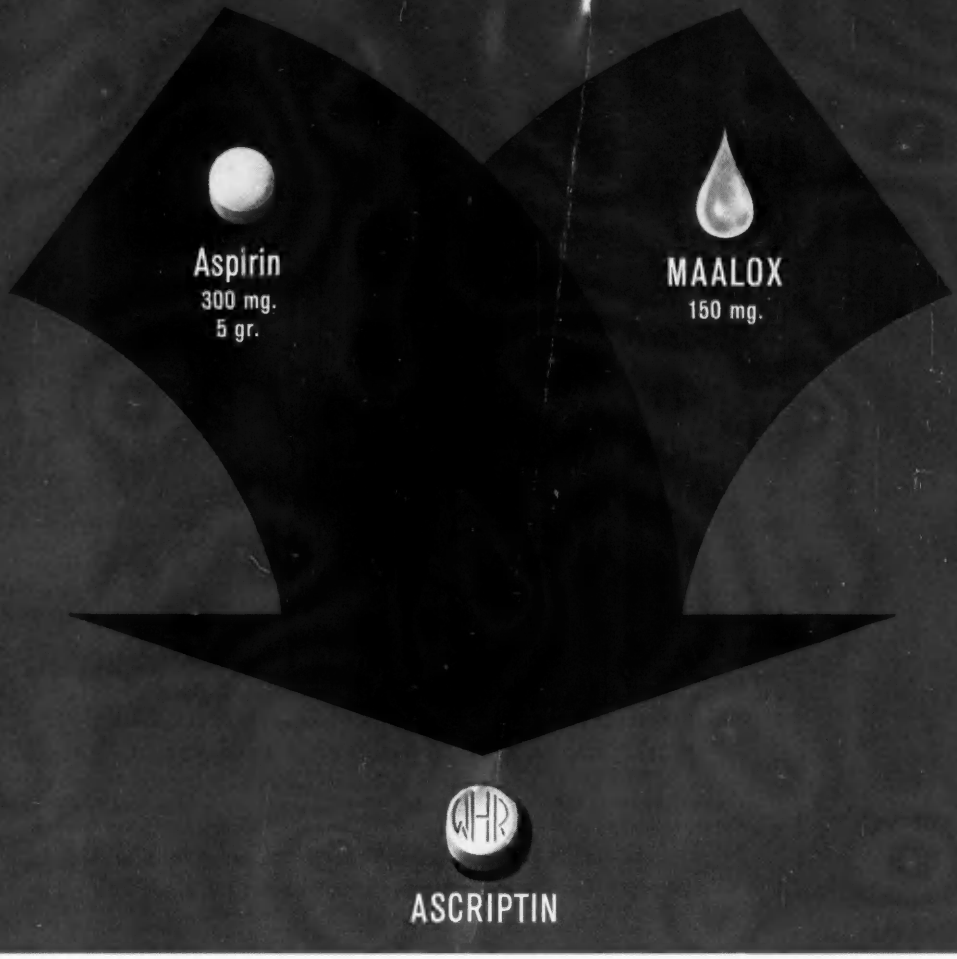

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Renal Vascular Hypertension

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HYPERTENSION, even in its mildest form, is a serious disease which shortens normal life expectancy and accelerates atherosclerosis.[37] Although modern drugs have been found effective in decreasing the mortality in severe hypertension,[29,36] long-term studies on the survival of treated mild hypertensive patients are not available, and the effectiveness of such therapy in delaying the development of atherosclerosis is not known. A complete cure of hypertension is therefore clearly superior to lifelong drug therapy.

The etiologic relationship of hypertension to diseases and abnormalities of the kidneys and their blood supply has been recognized increasingly since the initial observations by Bright in 1836.[3] More recently knowledge in this field has been advanced especially by the experimental work on renal ischemia by Goldblatt and coworkers[10] and the increasing use in hypertensive patients of diagnostic techniques such as pyelography, aortography and divided renal function studies.[5,14,24] Correction of a renal abnormality may result in a permanent cure of hypertension unless secondary arteriolar changes, which are thought to sustain the hypertension, have developed. It is imperative, therefore, to recognize the presence of correctible forms of hypertension as early as possible in the course of the disease in order to achieve a permanent cure. The actual frequency of correctible forms of secondary renal hypertension among the hypertensive population is unknown. Figures range from 1 to 5 per cent. In the light of recent work, however, it seems likely that the incidence is considerably higher.

The renal abnormalities associated with hypertension include parenchymal lesions, such as pyelonephritis or hydronephrosis, correctible only when the disease is unilateral and can be "cured" by nephrectomy; perinephric lesions such as perinephric abscess and fibrosis; and vascular lesions, partial or complete occlusion of one or both main renal arteries or their major branches due to any of the following:[19,39]

- Atherosclerotic concentric or eccentric plaques or intimal hyperplasia
- Fibromuscular medial hyperplasia
- Fetal membranes or intimal hyperplasia
- Coarctation or hypoplasia of the abdominal aorta and renal arteries
- Unilateral renal artery hypoplasia
- Localized inflammation or fibrosis as in arteritis or thromboangiitis
- Thrombosis formed locally, by extension from the aorta or embolic
- External compression due to scarring, fibrous bands, hematoma, abscess, cysts, tumors, aortic aneurysm or other aberrant overlying structures
- Trauma—accidental injury or surgical.

These arterial lesions are potentially correctable and it is with their diagnosis and treatment that this paper deals.

The mechanism by which impaired renal arterial flow produces hypertension has been the subject of

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intensive research and the many conflicting reports attest the confusion that still exists.* In experimental animals acute renal artery obstruction produced with a clamp results in the initiation of the renin-pressor mechanism due to a fall in blood flow, a fall in the mean pressure, or decrease in pulse pressure or pulsatile flow. Renin, a proteolytic enzyme probably formed and released by the granules of the juxtaglomerular cells of the afferent arterioles,[7] acts on a plasma substrate (alpha-2 globulin) formed in the liver, splitting off a decapeptide known as angiotensin (angiotonin I, hypertensin I). Angiotensin I is a compound with little pharmacologic activity until by the action of "converting enzyme," a circulating proteolytic enzyme, it is changed to an octapeptide named angiotensin II (angiotonin II) (hypertensin). This is a very active pressor substance which also stimulates aldosterone production.

There is considerable disagreement on the exact compound responsible for the elevated pressure of patients or experimental animals with hypertension, renin, angiotensin or some other pressor substance. Peart, using a pithed nephrectomized rat, has been unable to demonstrate renin or hypertensin in renal vein blood from patients with various forms of hypertension.[27] On the other hand, Helmer, using a spirally cut rabbit aorta strip preparation, was able to demonstrate the presence of a vasoconstrictor substance similar to renin and angiotensin in renal vein blood from patients with malignant hypertension and hypertension secondary to renal artery stenosis.[11] Angiotensin has recently been synthesized and the availability of this standardized pressor agent will help to clarify some of these discrepancies. It is quite possible that only small amounts of angiotensin acting over a long period can result in hypertension rather than abrupt rapid increases.[23] An understanding of the actions of angiotensin may be a key to the entire complex problem of hypertension.

The selection of patients with renal arterial lesions from among the large population of patients with essential hypertension presents a major problem since the clinical pattern of renal vascular hypertension is not always specific. The presence and exact anatomic localization of the arterial abnormality can be defined only by renal artery visualization (arteriography) or at operation. The routine use of renal arteriography in all hypertensive patients has been considered impractical and the potential risk of complications too high. Reports of retroperitoneal bleeding, hematuria and impaired renal function, transverse myelitis and reflex hypotension have deterred the clinician.[18] Therefore certain observations from the clinical history, physical examination, laboratory and radiologic studies which are a part of the usual diagnostic survey of hypertensive patients have been used to select the patients most likely to have demonstrable renal artery abnormalities as the cause of their hypertension.[28,31] These indications for arteriography are factors which suggest that the hypertension is atypical, differing in some way from the accepted pattern of essential hypertension. Included in the list are the following:

A history of:

- Onset of hypertension under the age of 30 or over the age of 50, especially in the absence of a family history of hypertension.
- Abrupt recent onset or exacerbation of existing hypertension.
- Recent unexplained flank or abdominal pain.

The presence on physical examination of:

- Fresh hemorrhages, exudates and papilledema in the optic fundi indicating accelerated disease.
- A bruit over the epigastrium or costovertebral angles.
- Localized aortic enlargement consistent with an aneurysm.
- Diminished pulses with or without a bruit over the iliac and femoral arteries indicating lower aortic and iliac atherosclerosis.

Radiologic evidence of:

- Difference in renal size of 1 cm. or more (normal variation in renal size is ± 0.5 cm., the left kidney normally larger than the right).[20]
- Delayed or diminished function of one kidney on intravenous pyelography.
- Delay and decrease in the height of the vascular phase in the radioactive renogram as measured over one or both kidneys.

Significant difference in separate renal excretion of:

- Sodium, water, phenolsulfonphthalein, potassium, chloride, etc. ("Howard" test).

In various series of patients selected for arteriography on the basis of the presence of one or more of these indications, the yield of arterial abnormalities has ranged from 25 to 50 per cent.[28,32] It must be stressed, however, that in occasional hypertensive patients with stenotic renal artery lesions none of these indications is present. Patients with mild, easily controlled hypertension and equal renal function and size may have lesions as well as those with severe fixed hypertension and impaired renal function. The high incidence of bilateral lesions (± 40 per cent in our experience), moreover, makes any

*References 2, 6, 11, 23, 26, 27.

test dependent on a comparison between the two kidneys of limited value. There is as yet no completely reliable means to screen out all patients with arterial abnormalities other than arteriography. Since, until recently, patients who did not have the above indications were excluded from arteriography, there are no figures on the absolute prevalence of renal arterial abnormalities in the hypertensive population. In one center all patients with a sustained diastolic blood pressure of 110 mm. of mercury or above are routinely submitted to renal arteriography.[12] Although the over-all percentage of patients with renal vascular abnormalities is lower than in the series quoted earlier, the potential benefits from finding such curable lesions is considered justification for the small but inevitable risk from arteriography.

The techniques used for arteriography include:

1. Translumbar aortic puncture which, although most widely used, may, in addition to the complications mentioned earlier, produce periaortic inflammation and fibrosis which interfere with surgical operation later.[28,35]

2. The retrograde transfemoral approach (Seldinger) which can be used for selective injection of single vessels and avoids many of the above complications but is not advised in patients with occlusive disease of the lower aorta, iliac and femoral arteries.[33]

3. The intravenous technique, which, although requiring a much larger volume of radiopaque dye, has been reported relatively free of complications but does not always give satisfactory visualization of small arterial details.[38]

The over-all risk can be considerably reduced by using local rather than general anesthesia and by avoiding multiple injections of large volumes of radiopaque medium.

Accurate diagnosis of renal arterial abnormalities depends primarily on the availability of good films, clearly demonstrating the renal arteries, and the recognition of the radiologic patterns of the different types of anatomic abnormalities. Overlying bowel or underlying bony structures may obscure critical sections of the arteries producing the false impression of an anatomic obstruction.[4] This often necessitates a repeat injection of radiopaque dye with the patient in a more oblique position. The origin of the renal arteries from the aorta is occasionally difficult to define clearly due to variations in its location and angle and the difficulty of excluding posterior wall plaques.

The radiologic patterns of renal artery obstruction are of four main types:

1. Complete occlusion, which may be very difficult to recognize unless a small stump is present or large collateral channels are visualized.

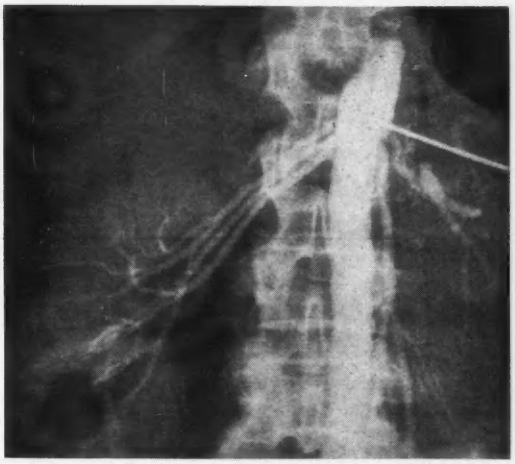

Figure 1.—Renal arteriogram showing multiple renal arteries on the right with normal vascularization of the right kidney; arteriosclerotic narrowing and tortuosity of proximal left renal artery with poststenotic dilatation.

2. Atherosclerotic plaques of older patients which usually occur at the orifice of the artery or within the first one-third, are often bilateral and may be associated with vascular disease in other vessels (Figure 1).

3. Fibromuscular hyperplasia of the media, observed in young patients with relatively mild hypertension, mostly women,[25] which usually occurs in the middle and distal two-thirds of the artery and produces alternating areas of constriction and dilatation (often aneurysmal) of the arterial lumen giving an "accordion pleating" effect. This lesion also may be bilateral and in older patients may be associated with atherosclerotic lesions at the renal artery origin (Figure 2).

4. Hypoplasia of one kidney and its blood supply, both of which may be ectopic, is occasionally seen; radiologically primary hypoplasia may be indistinguishable from atrophy secondary to chronic pyelonephritis or ischemia.

Multiple renal arteries or ectopic origin of the arteries have been considered nonpathologic variants and are not considered a cause of hypertension *per se*, although some recent work casts doubt on this.[8] The significance of isolated renal artery aneurysms or of intrarenal aneurysms in the etiology of hypertension is not certain although "cures" have been reported following the surgical removal of such lesions.[22,30] In addition to the definite abnormalities described above, minor irregularities of the lumen or uniform tapering of the artery are occasionally seen. Few of these have been investigated at operation or autopsy and their etiologic significance in hypertension remains uncertain. It will be necessary to perform serial arteriographic studies

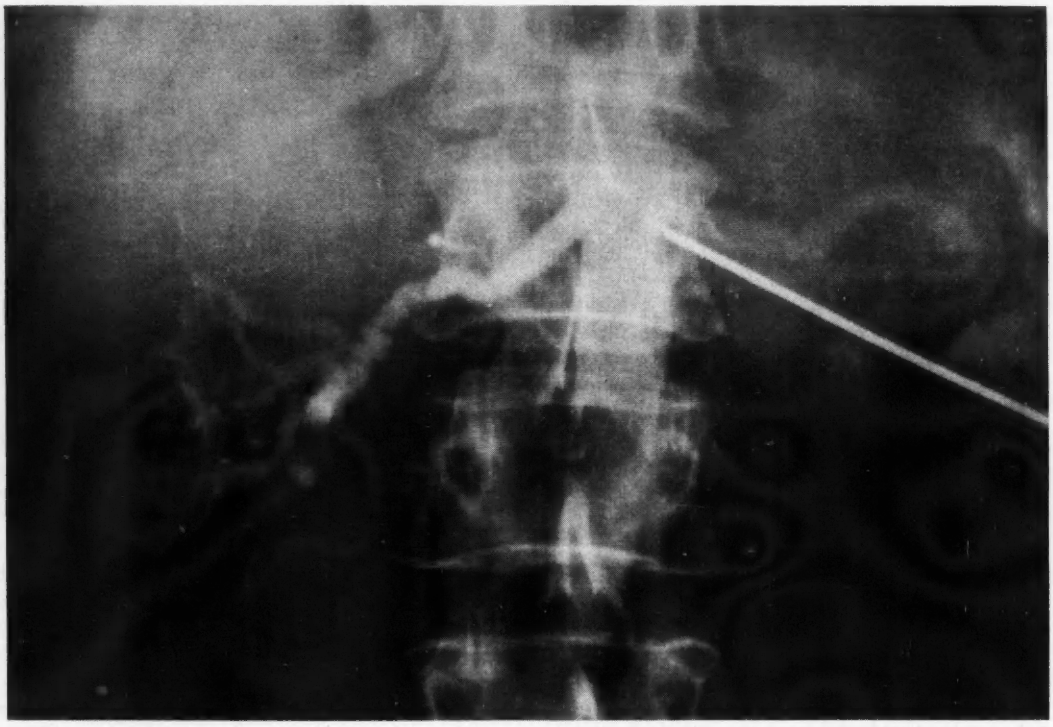

Figure 2.—Renal arteriogram showing right renal artery with alternating areas of narrowing and dilatation typical of fibromuscular medial hyperplasia.

on some of these patients to determine if these changes represent the early stages of occlusive disease.

The etiologic relationship of a specific arterial lesion to the hypertension of a specific patient is only proved if the hypertension subsides permanently following the correction of the lesion. However, secondary arteriolar changes in the kidney may be responsible for sustaining the hypertension postoperatively even after the primary defect has been corrected. Patients with longstanding hypertension in whom premature atherosclerosis has resulted in a renal artery plaque which has in turn accelerated the hypertension may not be cured of the underlying hypertension by removal of the occlusive plaque. Although unilateral decrease in renal sodium and water excretion (positive "Howard" test) has been observed preoperatively in patients with unilateral renal artery lesions whose hypertension subsided after nephrectomy, the "Howard" test is not always reliable in predicting the postoperative outcome and is of little value in the presence of bilateral disease.[5,28]

The choice of the surgical procedure for each case depends on several theoretical and practical considerations. Both experimental work in animals and observations in humans has demonstrated that the kidney distal to a stenotic renal artery may be a potentially normal kidney, unaffected by the arteriolar changes resulting from longstanding or accelerated hypertension.[1,13] Kolff and Page have presented experimental data suggesting that a normal kidney has a role in maintaining or restoring normal blood pressure in renoprival hypertension.[16] It is therefore desirable whenever possible to correct the arterial abnormality and preserve the ischemic but potentially normal kidney rather than to remove it, especially in the case of bilateral arterial obstruction. Reconstructive vascular techniques, however, require a highly skilled surgeon and the operative procedure is longer and more hazardous than simple nephrectomy. In older patients with cerebral and coronary atherosclerosis, the risks of the operation must be weighed against the advantages of reconstructive rather than ablative procedures. Impaired renal function, unless very severe, is not a contraindication to renal vascular operation, since it may actually be reversed by the procedure.[9]

Nephrectomy is the procedure of choice in patients with unilateral renal and renal artery hypoplasia, irreversible renal infarction or atrophy, and

extensive unilateral disease involving renal artery branches precluding vascular reconstruction.

Evaluation of the degree of stenosis produced by a lesion and the decision at operation whether a specific lesion produces sufficient stenosis to initiate the renal-ischemia pressor mechanism presents another problem. Some surgeons consider sufficient indication for surgical intervention the presence of a definitely palpable plaque or arterial wall thickening, especially when associated with a thrill and in the presence of a decreased pulse distally.[28] Morris and coworkers[21] perform routine pressure and flow measurements across the stenotic segment, and vascular reconstruction is considered in the presence of a definite gradient. These studies, however, are still in the experimental stage and their usefulness will be apparent mostly in borderline or questionable cases. The only available preoperative procedure for detecting the degree of renal blood flow impairment is the radioactive renogram,[40] a relatively simple test requiring expensive equipment. A minute dose of radioactive iodine-labeled Diodrast® or preferably Hypaque® or Hippuran® (dyes which are rapidly cleared by the kidney) is injected intravenously and the gamma radiation over the two renal areas is recorded continuously over a 10 to 30-minute period. The preliminary peak in the curve of radioactivity represents the first flooding of the kidney with blood (vascular phase); the second and longer portion, the accumulation of dye due to tubular excretion (secretory phase); and the last portion the excretory phase. Comparison of the curves from the two sides enables detection of impaired vascularization, detection of renal parenchymal disease and of stasis due to ureteral obstruction. This test promises to be of considerable help in determining renal vascularity both preoperatively and postoperatively.

The commonly used vascular reconstructive techniques include:

1. Thromboendarterectomy of the involved renal artery and associated aortic lesion if present.

2. Segmental resection of the diseased arterial portion with end-to-end reanastomosis of the uninvolved artery ends, occasionally necessitating mobilization of the kidney to avoid tension on the anastomosis.

3. Spleno-left renal arterial shunt—by-passing the stenosed segment (splenectomy is usually not necessary).

4. Insertion of a prosthetic by-pass graft from the aorta to a point distal to the stenosis in the renal artery.

The choice of technique depends in part on the side, the site and the extent of the lesion and in part on the experience and preference of the surgeon.[17]

The reports on the results from surgical treatment in different medical centers are still only preliminary because of the recent development of this field and lack of long-term postoperative observation in all series.

The percentage of cures of hypertension following revascularization or nephrectomy varies from the 82 per cent figure of Morris and coworkers[21] to the 40 per cent review figure of Kincaid-Smith.[15] The figures of Brown and associates,[4] Perloff and coworkers[28] and Poutasse, Dustan and Page[32] are in between these two extremes (Table 1). This wide range probably results from differences in the selection of the patient population, types of operative procedures and mean duration of follow-up. However, even the least favorable figures are considerably better than those of Homer Smith[34] for the over-all effectiveness of nephrectomy for cure of hypertension. Nor do the over-all figures reflect the importance of a complete cure in the life of any one relatively young patient who would otherwise have been destined to a life of drug therapy.

Failure of postoperative blood pressure fall suggests: (1) Inadequate revascularization, (2) secondary inoperable arteriolar changes due to long-standing hypertension, (3) extrarenal, possibly neurogenic mechanisms acting to sustain hypertension initiated by any mechanism.

The possibility of recurrence of the atherosclerotic plaques or medial hypertrophy is a real one; only long-term studies will clarify the frequency with which this will occur.

Following are two case reports: The first of a middle-aged man with malignant hypertension of recent onset due to an atherosclerotic plaque, and the second of a young girl with mild hypertension due to medial fibromuscular hyperplasia of the renal artery. Both have been "cured" of their hypertension.

In conclusion, we would like to stress (1) The apparent prevalence of renal vascular abnormalities in patients with hypertension, (2) the high percentage of apparent cures of the hypertension following adequate vascular reconstruction or nephrectomy in these cases. The localization of such vascular abnormality can be defined only by arteriography. In the absence of a completely reliable screening test this procedure must be considered in every severely hypertensive patient in spite of the small but present risk and morbidity from the procedure.

REPORTS OF CASES

CASE 1. A 47-year-old lumberman was in good health until 15 months before admission. Then he began having morning headaches, occasional epi-

TABLE 1.—*Results from Surgical Correction of Occlusive Renal Vascular Lesions in Several Medical Centers*

Authors	Time Period	Number of Arteriograms	Number of Patients with Arterial Lesions	Number of Patients Operated Upon	Number of Patients with Bilateral Lesions	Number of Nephrectomies	Number of Vascular Repairs	Number of Patients Improved by Surgery	Normal BP	BP Lowered but Not 140/90	No BP Fall	Deaths	Duration of Follow-up
Poutasse et al.[32] Cleveland March 1961	1955-1960	427	131 (31%)	80	17 (21%)	48	32	61 (76%)	39	22	9	10	<5 yr.
Morris et al.[21] Houston July 1960	1960	?	?	32	14 (44%)	2 (combined with vascular surgery)	30	26 (81%)	20	6	0	1	3 mo. to 2½ yr.
Perloff et al.[28] San Francisco April 1961	1952-1960	120	54 (45%)	38	8 (21%)	8 (4 combined with vascular surgery)	30	25 (66%)	14	11	6	7	1 mo. to 7 yr.
Brown et al.[4] London July 1960	1957-1960	160	20 (12%)	11	?	6	5	8 (73%)	7	1	3	0	1 mo. to 14 mo.

staxis and nocturia two to three times a night. He was found to have elevated blood pressure (no previous blood pressure readings were known) and was treated with reserpine and chlorothiazide. Because of difficulty in control of the hypertension and occasional symptoms of dizziness and blurred vision he was referred to the University of California Medical Center in San Francisco for further studies and therapy. Past history and review of systems were unremarkable. The patient's mother had died of heart disease but no family history of hypertension could be established. On physical examination he was observed to be well built and in no distress; the blood pressure was 240/140 to 220/120 mm. of mercury in both arms. Fresh hemorrhages and exudates were seen in both optic fundi, with questionable early papilledema. The heart was enlarged to percussion and a definite left ventricular heave was felt. The aortic second sound was booming in quality and a grade II-III harsh systolic precordial murmur was heard radiating to the axilla but not to the neck. Examination of the abdomen and extremities was normal except for decreased pulses in the right foot. No bruit was heard over the abdomen. Laboratory studies included a hemogram which was normal, persistent albuminuria in an otherwise normal urine (300 mg. per 12-hour specimen), nonprotein nitrogen of 41 mg. per 100 cc., serum creatinine of 1.4 mg. per 100 cc. with a clearance of 83 cc. per minute, normal serum electrolytes, cholesterol content 240 mg. per 100 cc. A culture of the urine was negative. An electrocardiogram showed advanced left ventricular hypertrophy. In a roentgenogram of the chest, slight left ventricular enlargement and elongation and tortuosity of the aorta, without calcification, were noted. An intravenous pyelogram (Figure 3) was interpreted as entirely within normal limits. Divided renal function studies were measured as follows:

Right Kidney	Left Kidney
Phenolsulfonphthalein:	Phenolsulfonphthalein:
75 cc. 15 per cent	120 cc. 17.5 per cent
Sodium:	Sodium:
30 cc. 1.6 mEq. per liter	50 cc. 10 mEq. per liter
31 cc. 0.8 mEq. per liter	55 cc. 8 mEq. per liter

Because of the apparently recent onset of malignant hypertension and the abnormal divided renal function study (positive "Howard" test) a renal arteriogram was performed using 15 cc. 76 per cent renografin injected by the translumbar route under local anesthesia (Figure 4). This was interpreted as showing stenosis of the proximal right renal artery with poststenotic dilatation and slight narrowing of the proximal left renal artery.

At laparotomy the right renal artery was found to be small and tortuous with only a barely palpable

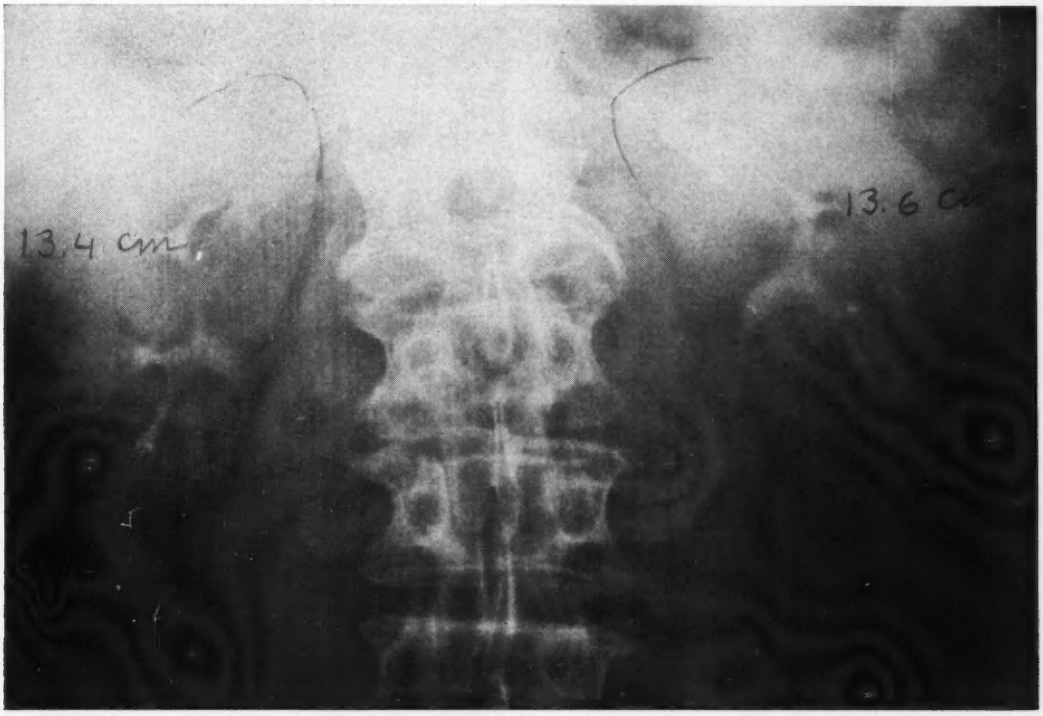

Figure 3 (Case 1).—Intravenous pyelogram showing almost equal renal size and prompt bilateral function on the 5-minute film.

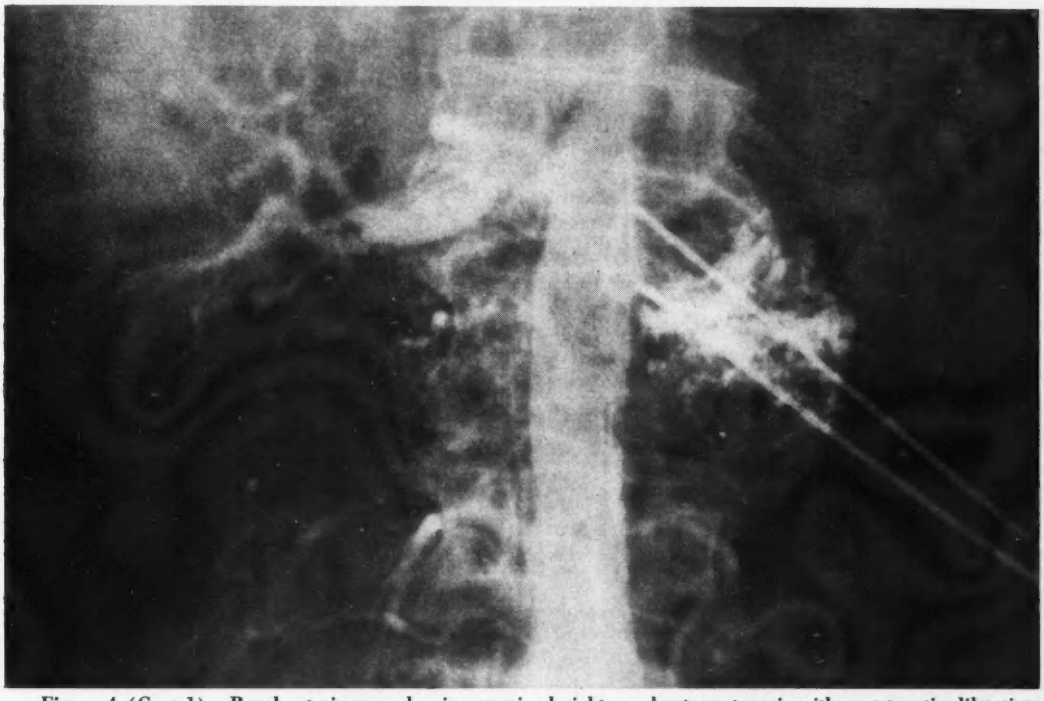

Figure 4 (Case 1).—Renal arteriogram showing proximal right renal artery stenosis with poststenotic dilatation. Extravasation of dye obscures left renal artery.

pulse and the origin of this artery from the aorta was considerably thickened. The proximal left renal artery was slightly thickened with an estimated 10 to 15 per cent narrowing but no detectably diminished pulse distally. A large plaque which almost completely occluded the right renal artery orifice was removed by thromboendarterectomy; following repair of the arteriotomy a good pulse was palpable distally. A right kidney biopsy specimen was also taken.

The pathologic report on the thromboendarterectomy specimen was "organized fibrous tissue showing myxomatous degeneration," and the renal specimen was interpreted as showing "focal interstitial fibrosis without evidence of arteriolar sclerosis." Postoperatively the patient's blood pressure decreased to 140/80 to 160/110 mm. of mercury and he made an uneventful recovery. Repeat divided renal function studies one week after operation were as follows:

Right Kidney	Left Kidney
Phenolsulfonphthalein:	Phenolsulfonphthalein:
27 cc. 10 per cent	10 cc. 7.5 per cent
Sodium:	Sodium:
35 cc. 184 mEq. per liter	11 cc. 138 mEq. per liter

The improved excretion on the right was considered consistent with the normal response after revascularization. The patient was readmitted three weeks later because of a pulmonary infarct without obvious source of emboli, and was treated with anticoagulants. Blood pressure at that time was 130/85 to 150/90 mm. of mercury, the electrocardiogram showed no change from the preoperative record, the serum creatinine was 1.0 mg. per 100 cc. with a clearance of 129 cc. per minute. The patient had no further pulmonary emboli; four months later anticoagulants were discontinued and he returned to full-time activity. At this time his fundi were classified as grade I-II using the classification of Keith and Wagener and his blood pressure ranged around 150/98 mm. of mercury. Seven months after the operation his blood pressure was 142/88 to 158/106 mm. of mercury with excitement, the fundi showed only grade I changes, and at 17 months his blood pressure was 120/80 to 130/86 mm. of mercury.

Case 2. An 18-year-old unmarried secretary was referred to the University of California Medical Center for evaluation of hypertension which had been diagnosed on routine examination at age 16. The blood pressure at age 14 was known to have been normal. Studies elsewhere revealed 1+ albuminuria on one urine specimen, normal phenolsulfonphthalein excretion, normal 24-hour urinary catechols, normal chest roentgenogram, mild left ventricular hypertrophy on the electrocardiogram,

Figure 5 (Case 2).—Initial intravenous pyelogram showing disparity in renal size with small left kidney and decreased calyceal opacification on the 5-minute film.

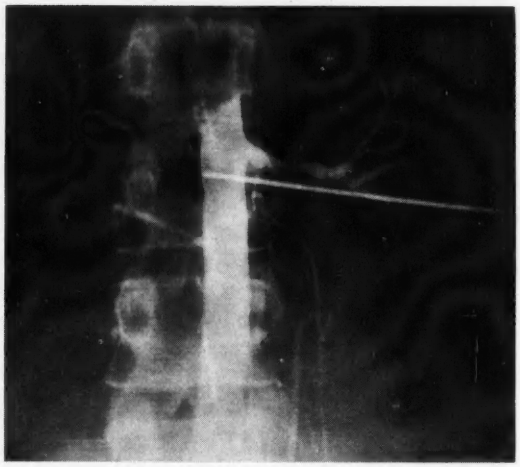

Figure 6 (Case 2).—Renal arteriogram showing stenotic segment in middle third of renal artery.

and slight decrease in size and function of the left kidney as observed by intravenous pyelogram (Figure 5). The patient was treated with reserpine and chlorothiazide with only moderate lowering of the blood pressure. She was known to have had a heart murmur since age 4 but denied past knowledge of renal disease, cardiovascular symptoms or other major illness. A maternal grandmother and three uncles had had hypertension.

On physical examination the patient appeared well developed and in no distress. The blood pressure ranged from 170/100 to 190/115 mm. of mercury in both arms, the fundi revealed only mild arteriolar spasm and narrowing without arteriovenous crossing changes. A soft blowing systolic mur-

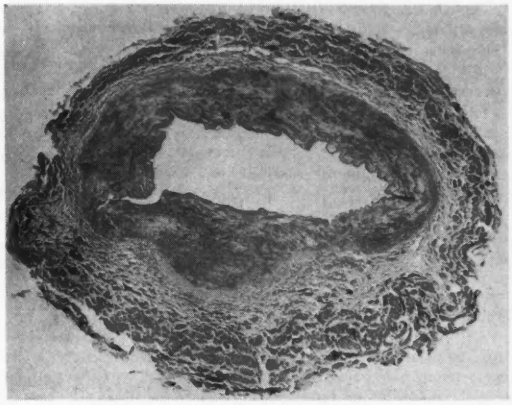

Figure 7 (Case 2).—Pathologic specimen—cross-section of stenotic segment of renal artery, showing localized thickening of the media. (Hematoxylin and eosin; ×25.)

mur was heard in the pulmonic area; the heart was not enlarged and the sounds were not abnormal. A loud systolic epigastric and low back bruit was noted. The peripheral pulses were normal. Results from laboratory studies included a normal hemogram and urinalysis, a serum creatinine of 0.8 mg. per 100 cc. with a clearance of 138 cc. per minute, and cholesterol content of 276 mg. per 100 cc. Early left ventricular hypertrophy was noted on a cardiogram; a roentgenogram of the chest was normal. Renal arteriography was performed because of the relatively recent onset of hypertension in a patient under the age of 20, the presence of an epigastric bruit and the slight discrepancy in renal size and function on intravenous pyelography (Figure 6). A localized segment of narrowing in the middle of the left renal artery was demonstrated.

At laparotomy, a constriction in the middle of the left renal artery was observed, and a thrill and diminished distal pulse palpated. This portion of the artery was resected and splenorenal arterial anastomosis with the distal uninvolved segment of the renal artery was carried out. The proximal renal artery stump was tied off; the spleen was not resected. Wedge biopsy specimens were taken from both kidneys.

Following operation the patient's blood pressure remained at 140/70 to 150/90 mm. of mercury, and recovery was uneventful.

The pathologic report on the surgical specimen was "fibromuscular hyperplasia of the renal artery" (Figure 7). The right kidney biopsy was normal and the left (the side of the arterial lesion) showed focal atrophy and fibrosis with chronic inflammatory cells.

Following discharge from the hospital the patient was observed at one to two month intervals. Her

Figure 8 (Case 2).—Postoperative intravenous pyelogram showing equal bilateral function on the 5-minute film with relative decrease in size of the right kidney and increase in size of the left kidney.

blood pressure remained around 120/70 to 130/80 mm. of mercury with occasional readings up to 150/84 mm. of mercury when she was excited or under tension. The epigastric bruit persisted but diminished in intensity. The fundi returned to normal, electrocardiographic tracings returned toward normal and an intravenous pyelogram 11 months after operation was interpreted as showing less discrepancy in renal size and function than the preoperative one (Figure 8). When last seen 16 months after the operation, her blood pressure was 138/78 to 128/76. She was entirely asymptomatic.

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Hypernatremia

Its Significance in Pediatric Practice

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• **Hypernatremic dehydration is a fairly common and potentially very dangerous illness in infants and children. It occurs during the course of a wide variety of illnesses.**

Predisposing factors include central nervous system diseases, decreased fluid intake, increased fluid losses from hyperventilation, perspiring, diarrhea and emesis, increased aldosterone output (contributing to sodium retention), the infant's high obligatory renal water loss and the practice of feeding infants fluids with a comparatively high solute content.

If the attending physician is aware of the predisposing factors and makes an early diagnosis and then rehydrates the patient slowly using solutions which contain some salt, the outcome will most likely be favorable. Even though the brain appears to be damaged during rehydration, the patient may make a complete recovery if proper supportive measures are instituted.

ALTHOUGH HYPERNATREMIA (serum sodium concentration of 150 mEq. per liter or more) is by definition a laboratory diagnosis, early evaluation and proper management remain largely a clinical responsibility. Because delayed or inappropriate therapy can lead to irreversible brain damage or death, it behooves every physician who cares for sick children to acquire an understanding of hypernatremic dehydration. The purpose of this paper is to review the factors of clinical significance in practice and to present some of the findings in a study of 93 infants and children with hypernatremia at the Children's Hospital of the East Bay in Oakland.

PREDISPOSING FACTORS

Several predisposing factors make infants peculiarly susceptible to the development of hypernatremic dehydration (Figure 1). A relatively large surface area permits a correspondingly increased evaporative loss of water from the skin and lungs (insensible loss). This loss is greatly magnified when there is sweating in response to fever or environmental heat and when there is hyperventilation due to respiratory disease, acidosis, fever and crying.

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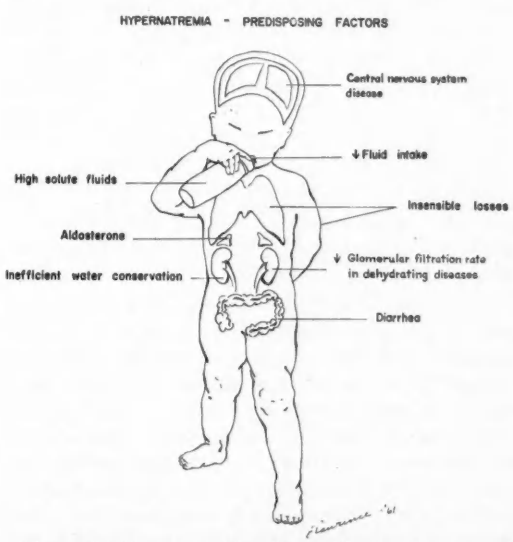

Figure 1.—Factors predisposing to the development of hypernatremia in infants and children.

Approximately one out of five children admitted to the hospital for diarrhea has hypernatremic dehydration. The role of diarrhea in the production of hypernatremia has been particularly emphasized and perhaps overemphasized. This may reflect the frequency of diarrhea in infants and the fact that pediatricians have been trained to observe serum electrolyte content in such patients with great diligence. A recent study[10] showed no correlation between sodium loss in diarrheal stools and serum sodium values, but diarrheal stools that produce a greater loss of fluid than of electrolytes may be significant.

A less apparent but perhaps more fundamental etiologic factor is to be found in the infant's immature and normally inefficient renal concentration mechanism that requires a persistently high obligatory loss of renal water. Furthermore, a dehydrated sick infant is able to conserve water even less efficiently than a normal infant. It has been shown that both the glomerular filtration rate and the urea clearance are decreased in dehydrating diseases.[1] Factors such as fever and the disease itself which augment tissue breakdown will increase the solute

load. When in addition there is underlying renal disease, the infant is further handicapped. (Six per cent of the patients in the present study had serious renal diseases.)

Central nervous system diseases in children (cerebral concussion, mental retardation, brain tumor, meningitis, subdural hygroma) predispose toward hypernatremia even when there has been no dehydration.[3] This effect is possibly mediated through aldosterone, since it has been shown that a hormone adrenoglomerulotropin produced in the region of the pineal gland influences the production of aldosterone.[6] Aldosterone causes a decrease in renal sodium excretion. (In the present series 14 per cent were mentally retarded, 1 per cent had brain tumor and 3 per cent had meningitis.)

All the above factors may be compounded by the fact that a sick infant invariably fails to ingest adequate quantities of fluids. In addition, many are given boiled skim milk and other fluids high in electrolyte content as therapy for the diarrhea. Skim milk has a higher amino acid and electrolyte content per ounce than whole milk and therefore presents an additional solute load to the kidney at a time when the infant is less able to handle it. Even giving dilute hypotonic electrolyte solutions may not prevent the development of hypernatremia unless enough extra water is given to cover not only the diarrheal losses but also the increased insensible losses.[7]

CLINICAL DIAGNOSIS

Essential to an early diagnosis of hypernatremia is a physician with a high index of suspicion. Actually, the baby's appearance may be deceptively good until dehydration has become severe. Because two-thirds of the water lost in hypernatremic dehydration is intracellular water, the skin turgor may well be normal despite a loss of 10 per cent or more of the body weight.[9] Also vascular collapse comes rather late in the disease since only one-third of the water loss involves the extracellular compartment. When vascular collapse (shock) does occur, it is likely to be precipitous and a late and ominous sign.

Symptoms referable to the central nervous system are frequent, especially pronounced irritability, muscular hypertonicity, convulsions and stupor. These symptoms may be so pronounced that the physician will suspect meningitis; and if a lumbar puncture is done, the spinal fluid protein is likely to be found to be elevated.[11]

The initial history may lead the physician to suspect hypernatremia if he questions carefully as to exact fluid intake. Data from the present study indicate, however, that there are many instances in which hypernatremia cannot be predicted on the basis of the history and suggest that greater emphasis be placed on obtaining initial serum electrolyte determinations in any child with moderate to severe dehydration from any cause.

PATHOLOGIC PHYSIOLOGY

Why does a patient with hypernatremic dehydration have so many central nervous system manifestations? The degree of dehydration may not be any greater than in a patient with isotonic dehydration; and, yet, the hypernatremic patient is likely to have a more difficult time.

All hypertonic solutions produce tissue dehydration. Experimentally, the central nervous system symptoms produced by the infusion of hypertonic sodium solutions are, however, more severe than the symptoms due to the infusion of equally hypertonic solutions of sucrose or urea. This is presumably because sucrose and urea diffuse into central nervous system cells to equalize osmolarity; whereas, sodium does not.[9] In order for the central nervous system cells to increase their osmolarity to that of the hypernatremic extracellular fluid, two things are thought to occur: (1) water leaves the central nervous system cells and (2) the intracellular proteins break down to form intracellular solutes (potassium and amino acids). The severe disruption of intracellular proteins could, of course, account for the drastic and sometimes permanent impairment of brain function.

Severely dehydrated hypernatremic infants (and kittens) are known to develop cerebral petechiae, subdural effusions, subdural hematomas and cerebral vein thrombosis.[8,9] To what extent the vascular alterations are due to dehydration alone and to what extent they are due to combined dehydration and hypernatremia is not, at present, clear.

Physicians should be aware that central nervous system symptoms can be precipitated by infusing electrolyte-free or highly dilute fluids too rapidly during therapy. Sudden dilution of the extracellular fluid frequently initiates convulsions. Such convulsions have been terminated by reinfusing with hypertonic saline solution until the serum sodium returned to the same high level that was present before therapy was begun.[23]

Even with optimal fluid therapy, a hypernatremic patient occasionally retains water in inappropriate amounts. When this occurs, the extracellular fluid volume overexpands and produces symptoms (such as convulsions, irritability, lethargy and unconsciousness). This was demonstrated by balance studies on 11 infants with hypernatremia and gastroenteritis. The five infants who had convulsions retained water inappropriately and formed a scant amount of urine after intravenous therapy was begun; whereas the six infants who did not become

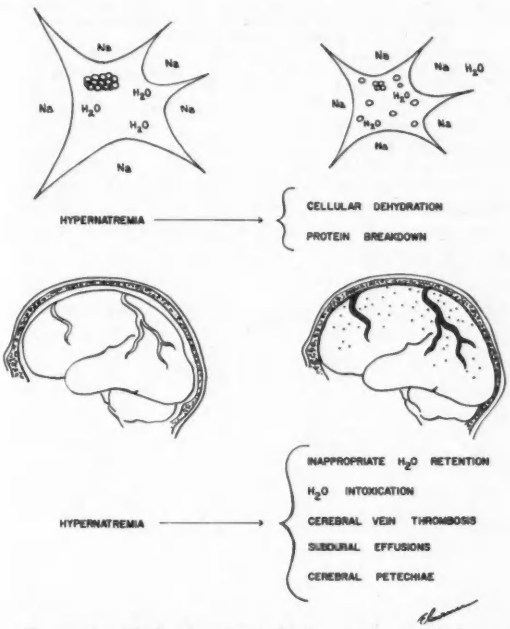

Figure 2.—Mechanisms by which a patient with hypernatremia develops central nervous system symptoms: The brain cells lose water and shrink and the intracellular protein molecules break down. The complications illustrated in the bottom half of the figure occur frequently.

severely ill and did not have convulsions began forming dilute urine as soon as intravenous therapy was begun.[16]

In dogs, experimentally induced hypernatremia (both with and without dehydration) produces renal tubular necrosis.[12] (In the one patient in the present series who died as a result of hypernatremic dehydration, hemorrhagic necrosis of the renal papillae was observed on postmortem examination.)

Aldosterone output (aiding retention of sodium) is increased in dogs dehydrated by inducing vomiting or withholding fluids; and there is some evidence that this also occurs in humans.[14] If so, one wonders why hypernatremia does not occur even more frequently than it does.

REPORT OF STUDY

During a 13-month period at the Children's Hospital of the East Bay, 93 patients were reported to have serum sodium values of 150 mEq. per liter or more; in 20 the content was found to be 160 mEq. per liter or more; in two it was over 190 mEq. Fifty-six per cent of these hypernatremic patients were under one year of age. Most papers dealing with hypernatremia have emphasized the importance of diarrhea or of excess salt intake or both as predisposing to the development of elevated serum sodium concentrations. In the present study only a slight majority (56 per cent) had diarrheal disease. Only four patients had a definite history of excess salt intake—two by oral intake of electrolyte solutions and two in parenteral fluids.

TABLE 1.—*Primary Diagnosis in 28 Living Patients with Hypernatremia*

Na Over 150 mEq. per Liter	No. Cases
Dysautonomia	1
Pneumonia	1
Intussusception, volvulus	1
Pneumococcal sepsis	1
Pyloric stenosis	2
Diabetes	3
Exstrophy bladder, ureters in colon	1
Cystic fibrosis	1
Meningococcemia	1
Acetyl salicylic acid ingestion	3
Milk allergy	3
Nephrosis	1
Meningoencephalitis	3
Burn	1
Hypophosphatemic rickets	1
Na Over 160 mEq. per Liter	
Tuberculosis, pulmonary	1
Megacolon, Fleet enema	1
Intussusception, volvulus	1
Cleft palate with otitis media	1

TABLE 2.—*Primary Causes of Death in 16 Patients with Hypernatremia*

Na Over 150 mEq. per Liter	No. Cases
Cystic fibrosis	1
Congenital heart disease	4
Chloromycetin intoxication	1
Renal disease	2
Leukemia	1
Arsenic intoxication	1
Volvulus, perforation	2
Pneumococcal pneumonia	1
Na Over 160 mEq. per Liter	
Brain tumor	1
Myocarditis	1
Dehydration, dural sinus thrombosis, subdural hematoma	1

Table 1 lists the diagnoses in the surviving patients who did not have diarrheal disease. Table 2 lists the primary causes of death in 16 patients who died. Only one died as a direct result of hypernatremic dehydration. Necropsy revealed dural sinus thromboses, subdural hematomas and hemorrhagic necrosis of the renal papillae.

TREATMENT

Primary in the treatment of any severely dehydrated patient is the replacement of fluid losses by appropriate intravenous therapy.

If the patient is in shock, a compelling emergency exists; and the fluid given should be such as to expand the intravascular compartment even though on admission one may not know the state of hypernatremia or hyponatremia. Plasmanate®* has proved to be very useful in this regard. Plasmanate® re-

*Cutter, 5 per cent reconstituted human serum protein solution.

quires neither refrigerator storage nor the typing necessary for blood and does not carry the risk of transmitting hepatitis.

If the patient is not in shock, the safest solution for initial hydration is N/3 saline (0.3 per cent) in 5 per cent glucose solution while waiting for the laboratory to report initial electrolyte values. If the patient is hypernatremic, further therapy is planned to bring the electrolytes into balance slowly by using hypotonic (0.11 per cent to 0.2 per cent) saline in 5 per cent glucose solution. (This provides 17 to 30 mEq. of sodium per liter.) It is necessary that the hydrating solutions contain some sodium if water intoxication (which occurs relatively easily in hypernatremia) is to be avoided. There are fewer nervous system complications if rehydrating solutions contain from 15 to 45 mEq. of sodium per liter. The surviving patients in the present series, observed for 10 to 12 months after recovery, did not have mental damage.

In one case in the series apnea resulting from central nervous system depression was successfully treated with intermittent positive pressure breathing. Complete rehydration and correction of the serum sodium need not and should not be rapid. Actually, once a patient is out of shock, there is no need for haste; and, in fact, it is impossible to correct severe hypernatremia rapidly. Patients do best when the serum sodium content is gradually brought back to normal over a period of two or three days.

A rough estimate of the degree of dehydration can be made if the patient's weight immediately before the dehydrating episode is known. If an infant is calculated to be over "10 per cent dehydrated" (10 per cent weight loss), he will need about 100 ml. of fluid per pound of body weight for the first day; if between 5 and 10 per cent dehydrated, about 80 ml. per pound for the first day; and if less than 5 per cent dehydrated, about 60 ml. per pound.

By the second or third day, when rehydration is well under way, the quantities of fluids required are reduced to approximately the amounts shown in Table 3.

All fluid therapy must be evaluated daily, and sometimes on an hourly basis, depending on the patient's output and the serum electrolyte determinations. All forms of fluid output must be considered: urine, diarrhea, sweating, hyperventilation, emesis and fluid suctioned off from the gastrointestinal tract.

If the patient is both dehydrated and in heart failure—as sometimes occurs, digoxin is used along with intravenous fluids. Both the heart failure and the dehydration must be treated simultaneously. Digoxin is preferred for infants and children because of its quick action and fairly rapid elimination. For infants under two years of age, the digitalizing dose is 0.03 to 0.04 mg. per pound of body weight. Half that amount is given as the first dose, with the remainder divided equally and given at eight-hour intervals or more frequently, according to need. For older children, the digitalizing dose is 0.02 to 0.03 mg. per pound of body weight. The maintenance digoxin dose is from one-fifth to one-third of the total digitalizing dose per day.

The sequence of events in the treatment can be summarized as follows: Evaluating of the degree of dehydration; determining whether shock or heart failure is present; determining the electrolyte contents of the blood. Then initial intravenous fluid therapy: Plasmanate® (plasma substitute) if the patient is in shock; otherwise, 0.3 per cent saline in 5 per cent glucose solution while awaiting laboratory reports.

After renal function is established (urination), potassium is added in amount of 3 mEq. per kilogram of body weight per day (not to exceed 40 mEq. per liter) to the intravenous fluids until oral feedings are established.

Other supportive measures that may be needed are: digoxin, if in heart failure; antibiotics, if bacterial infection suspected; calcium gluconate, for tetany which may occur when the acidosis is corrected and the serum calcium is low or borderline; intermittent positive pressure breathing for respiratory failure; subdural taps, if there is persistent unexplained fever or continued convulsion; and phenobarbital or other anticonvulsants.

TABLE 3.—*Amount of Fluid (0.2 Per Cent Saline in 5 Per Cent Glucose) Required Daily for Normal Maintenance of Hypernatremic Patients*

	Milliliters per Day		
	Per Pound of Body		Per Kg. of Body
Premature infants over 7 days old	75	or	150
Infants under 1 year	60		125-150
Children 1 to 5 years	50		100-125
Children 5 to 10 years	30-40		75-100

Once renal function is established, add potassium in amounts of 3 mEq. per kg. of body weight.

TABLE 4.—*Caloric, Sodium and Potassium Content of Fluids Commonly Given to Infants*

	Calories per Liter	Na mEq./l	K mEq./l	Mg. N/l
Human milk	650	7	14	1920
Cow's milk (whole)	670	22	36	5300
Cow's milk (skim)	375	23	37	
Orange juice	500	0.2	49	
Apple juice	480	1.7	26	
Pineapple juice	500	0.2	36	
Ginger ale	360	3.5	0.1	
Coca-Cola	435	0.4	13	
Lytren®*	280	50	20	

*A concentrated solution of electrolytes.

PREVENTION

Foremost in the prevention of hypernatremia is an awareness on the part of all physicians that this condition is fairly common (occurring in 10 to 33 per cent of infants put in hospital for diarrhea) and the realization that it results from a combination of factors including diminished intake of water, diarrhea, hyperventilation, sweating, excessive salt intake and protein breakdown. Prevention begins at home as soon as the physician is aware that the child is ill. The mother should encourage the child to maintain adequate fluid intake, and this fluid should contain a lower concentration of salt than the patient normally takes. This is necessary in order to provide fluid for the increased insensible losses (through the skin and lungs) that occur with illness of any kind. Both skim and whole milk contain salt (Table 4). In order to provide extra water during illness, the mother should dilute the milk and add sugar. The extra sugar will help to delay tissue breakdown and at the same time make the milk more palatable. Fruit juices, ginger ale and Coca-Cola contain about a tenth as much sodium as milk and are very useful supplements or substitutes for milk when infants and children are ill.

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A New Corticoid for Topical Therapy

Fluocinolone Acetonide

JUD R. SCHOLTZ, M.D., Pasadena

• Sixty-seven patients with chronic and subacute cutaneous lesions of varying long duration that had previously been resistant to topical use of corticosteroid compounds were treated with a cream containing fluocinolone acetonide. To avoid subjective bias, only two classifications were used in appraising results: "complete clearing of treated lesions" and "not effective."

Forty-eight patients had complete clearing of the treated area. Results were best in atopic dermatitis, chronic eczematous dermatitis and nummular dermatitis. Granuloma annulare, dyshidrotic dermatitis of the palms and psoriasis were not affected.

In some cases in which there were multiple lesions some of the lesions were treated with fluocinolone acetonide cream and some were treated concurrently with other corticoid ointments or with noncorticoid compounds, either bland or with active ingredients. Fluocinolone was effective in more than twice as many cases as the other agents.

In some of the patients with chronic disease it was possible to greatly reduce or discontinue systemic steroid therapy after fluocinolone acetonide became available.

No untoward effects were observed.

THIS IS A REPORT of the results of the use of fluocinolone acetonide* as a topical treatment of 67 patients with various inflammatory disorders of the skin. The only published report at the time of this writing on the clinical use of this compound is that of Robinson,[3] who found it to be as effective as triamcinolone acetonide and superior to hydrocortisone in the topical therapy of eczematous dermatoses. The chemical make-up of fluocinolone acetonide was discussed in a report by Mills and coworkers.[2]

In the present study the compound was used in a water-miscible vanishing cream base in a concentration of 0.025 per cent. Patients were instructed to apply it lightly three times a day and to massage gently and thoroughly until the cream disappeared.

All the patients were observed in private practice in the office. Many had been observed for several years, and the great majority had chronic recurrent dermatosis in the general category of eczematous dermatitis and had been treated either in the present or past episodes by a variety of currently available methods of therapy, including systemic and topical use of corticosteroids.

CONDITIONS FOR EVALUATION

Evaluation of treatment of acute dermatitis is difficult because so many acute lesions clear spontaneously when the eliciting cause is no longer operating. For this reason, in the beginning of this study we selected only chronic and subacute lesions which had been present for months, and in some instances for years, and which had been resistant to previously applied topical corticosteroids. Furthermore, only two classifications of results were used; one was "very effective with complete clearing of treated lesions" and the other was "not effective" (which included no response or partial response). Use of these absolutes eliminated subjective factors —such as "wishful thinking"—from the appraisal of results.

The relative effectiveness of the compound under discussion was demonstrated in the following ways:

1. It was used on given lesions in patients with multiple lesions and the result was compared with the effectiveness of other standard corticoids used on comparable lesions concurrently.

2. It was used in patients with single chronic lesions in certain cases in which all previously available local and systemic therapy had failed.

3. In patients with multiple lesions, it was used on given lesions, while with other noncorticoid therapy (either bland or other) used concurrently on existing comparable lesions.

CLINICAL RESULTS

Of 67 patients treated (Table 1) 60 had dermatosis of a nature that might be expected to respond to corticoid therapy[1,4]—namely, the general cate-

Presented before the Section on Dermatology and Syphilology at the 90th Annual Session of the California Medical Association, Los Angeles, April 30 to May 3, 1961.

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*Fluocinolone acetonide (6α,9α-difluoro-16α-hydroxy-prednisolone-16, 17 acetonide), kindly supplied, as Synalar® by Syntex Laboratories, Inc., 10 East 40th Street, New York 16.

TABLE 1.—*Results of Treatment of Various Kinds of Dermatosis with Applications of Fluocinolone Acetonide Compound*

Diagnosis	Number of Cases	Results: Very Effective (Complete Clearing of Treated Lesions)	Results: Not Effective (Partial or No Response)
Atopic dermatitis ("disseminated neurodermatitis")	16	14	2
Nummular dermatitis	12	11	1
Chronic eczematous dermatitis (unclassified)	14	11	3
Chronic lichenified (dry) dermatitis (lichen simplex or "localized neurodermatitis")	4	2	2
Seborrheic dermatitis	5	5	0
Acute and subacute contact dermatitis	5	4	1
Infectious eczematoid dermatitis (includes otitis externa, 1 case)	2	1	1
Dyshidrotic dermatitis of the palms	2	0	2
Psoriasis	3	0	3
Granuloma annulare	1	0	1
Chronic lupus erythematosus	3	0*	3*

*These three patients showed partial response. Since then, four additional patients have shown prompt and complete clearing. Further experience is needed for valid conclusions.

gory of eczematous dermatitis. Forty-eight of the 60 showed excellent response. In 45 of the patients, the compound under study was compared with one or more of the corticoids currently in clinical use. These included hydrocortisone, triamcinolone and dexamethasone. In 32 of the 45, results with fluocinolone acetonide were better than with the other corticoid; in 11 cases, it was considered equal to the compound with which it was compared (neither having any effect in four of these cases, and both being effective in seven). In two cases of the 45, fluocinolone acetonide was found to be not as effective as the drug with which it was compared—(triamcinolone in one case and hydrocortisone in the other).

The point should be made that what is reported here is the response of individual lesions to treatment, and it is not to be assumed that clearing of lesions means curing of the disease. It is obvious that the clearing of given lesions (in seborrheic dermatitis, for example) does not mean that the disease had been cured. The same principle applies to many cases in this group. Many of the patients have since had new lesions at other sites, which have responded equally well to the same treatment. However, in some patients in this group with chronic disease it has been possible to greatly reduce or completely eliminate the systemic use of steroids since fluocinolone acetonide has become available, topical therapy alone healing new lesions for these patients.

COMPLICATIONS AND REACTIONS

In only one of the 67 patients was there some question of local irritation attributable to the fluocinolone acetonide compound. Results of patch tests with the substance in that patient were negative, and after a rest period of one week the compound was used again, without difficulty. Five patients used the compound almost daily for five months without sign of irritation or sensitization. Nothing that could be interpreted as a systemic effect was noted in any of the patients. No chemical studies of body fluids with this in mind were done, however.

DISCUSSION

Fluocinolone acetonide appears to be a highly effective agent for the topical therapy of inflammatory dermatosis, especially that of eczematous character. It was consistently effective in nummular dermatitis and seborrheic dermatitis, frequently effective in atopic dermatitis and chronic nonspecific eczematous dermatitis; and apparently (on the basis of limited experience) it has a striking effect in acute contact dermatitis.

It was not effective in the treatment of psoriasis, granuloma annulare, or dyshidrotic dermatitis of the palms. Of special interest is its possible effect on chronic cutaneous lupus erythematosus. When adrenal corticosteroids were first introduced for topical use, there were some reports and experiences which indicated that they might be useful in healing individual lesions of chronic cutaneous lupus erythematosus. My experience with three patients indicates that there may be some effect (Table 1).

Seven of the 12 patients who were not benefited by topical therapy with fluocinolone acetonide had complete but temporary subsidence of lesions while receiving systemic steroid therapy.

This compound appears to produce results with topical application that are comparable to those brought about with systemic corticoid therapy. In the present series responses were noted that were

as dramatic as those sometimes observed with systemically administered steroids but rarely occurring with topical therapy available up to the present.

960 East Green Street, Pasadena.

NOTE: Since the preparation of this paper, the compound has been highly effective in more than 80 per cent of 260 additional patients. When used as an occlusive dressing, lesions of psoriasis responded rapidly. This will be reported in a separate communication.

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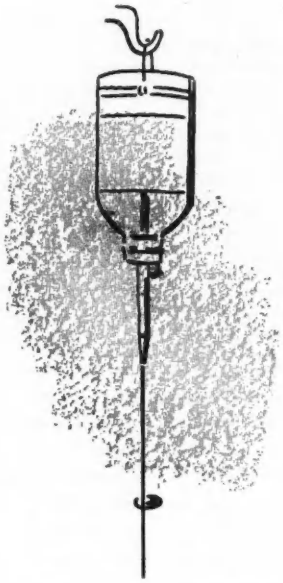

Aspiration of Breast Cysts

MAX R. GASPAR, M.D., Long Beach

• **In 1,364 cases of breast cyst aspiration reported in the literature, there is no note of a missed diagnosis of carcinoma.**

The author carried out needle aspiration in 80 patients with a definite mass in the breast as a therapeutic or diagnostic procedure.

A diagnosis must be established for every definite mass in the breast and needle aspiration is a logical diagnostic procedure. If the needle encounters a solid mass, the mass must be removed for biopsy. If the needle encounters a cyst containing fluid, the fluid should be removed completely. A biopsy specimen then should be taken from the mass if (a) the fluid is bloody, (b) the mass does not entirely disappear, or (c) the mass recurs promptly. Adherence to these rules will keep the examining physician from missing a carcinoma within the cyst.

Aspiration of breast cysts is a simple and safe diagnostic and therapeutic procedure that saves the patient distress and money.

FOR YEARS medical students have been taught that every lump in the breast should be biopsied. This dogma is so widely accepted that apparently many surgeons are reluctant to oppose it. Rosemond and coworkers[20] reported that in June, 1954, at a meeting of the Committee for the Study of Delay in the Diagnosis of Breast Carcinoma for Philadelphia County, a vote was taken on the advisability of aspiration of breast cysts. Six members voted against aspiration, three voted for aspiration, and three members abstained from voting.

Aspiration of breast cysts is so simple and safe a diagnostic tool that it is amazing this procedure has not met with universal approval. One could hardly improve on Mathew's[17] statement: "The immediate relief that aspiration of a cyst gives to the frightened patient who has discovered a breast tumor is almost beyond belief. There are few occasions in a surgeon's career when he can give such immediate relief to mental suffering, establish a diagnosis, and usually cure the patient."

HISTORY

In 1899, Bull[2] recommended aspiration of breast cysts and reported 14 cases. He stated that puncture of a cyst with a needle and drawing the contents into a hypodermic syringe should never be neglected. He recommended excision only if the cyst refilled or in case of an unusually large single cyst or multiple cysts, or if the patient was of an exceptionally nervous type. In 1903, Abbe[1] reported using the technique for ten years and recorded 41 cases.

Since those early reports, there have been a dozen or so papers specifically dealing with aspiration of breast cysts or at least mentioning the procedure. Johnston's[14] report in 1954 was particularly good. He reported 45 cases in which the patients were carefully observed afterward. Olch's[18] report of 229 patients he personally observed after aspiration, the largest series in the literature, is also well worth reading.

METHOD

Although the dictum that any "dominant lump" must be investigated is excellent, the term might possibly be construed to mean that where there is more than one lump in the breast, only the "dominant" one need be investigated. I prefer the principle be stated: Any definite mass must be investigated.

It is only when there is a definite mass in the breast that the surgeon becomes directly concerned. The physician making an examination in these circumstances must exercise all his skill in palpating the breast in question and must investigate every "definite mass." If there is doubt in his mind whether one is there or not, he may have to treat an indefinite area as a "definite mass." He must never become so clever as to assign the function of the microscope to the tips of his fingers.

For all practical purposes there is really only one breast lesion which is important to the patient and the doctor—cancer (or sarcoma), for it is the only one that might be fatal. Benign tumors, cystic disease, abscesses and the more rare lesions, such as those of tuberculosis, are not of fatal significance. In fact, cystic disease tends to be self-limited.

When a physician has determined that there is a "definite mass" in the breast, it is his responsibility to determine its nature. If a lesion is quite obviously carcinoma, there is no reason for introducing a needle into it unless one believes in the use of this technique for biopsy. However, if there is question whether the lesion is malignant or not, it is excellent practice to introduce a needle into the mass.

From the Harriman Jones Clinic and Hospital, Long Beach 2.

Presented before the Section on General Surgery at the 90th Annual Session of the California Medical Association, Los Angeles, April 30 to May 3, 1961.

After appropriate skin preparation, a small skin wheal is raised by injection of a 2 per cent local anesthetic solution beneath the skin over the mass. Then a tiny nick in the skin is made with a No. 11 scalpel. This will allow the needle to be introduced beneath the skin without undue pressure. If excess pressure is needed, the needle may miss the mass because of inaccurate guidance after it passes through the skin. A sharp No. 18 needle connected to a dry syringe is used for the larger masses. A sharp No. 20 needle is used for the smaller masses. The syringe is dry so that even a few drops of cystic fluid will be seen and not confused with any other liquid that might be present. A fresh, dry needle and syringe is used for each separate mass if there are more than one.

After the needle is introduced through the skin, the surgeon holds the lesion immobile by pressing with his fingers. Occasionally a small, movable or deeply placed lesion will be difficult to hold still enough for insertion of the needle. In such cases an assistant can help hold it. If there is fluid present in the mass, it is usually under considerable pressure and, as soon as the needle reaches it, will enter the syringe, pushing back the plunger. All the fluid in the cyst can be emptied by aspiration and by gentle pressure on the cyst wall.

If no fluid is obtained, the surgeon must make sure that the needle is in the mass. This may be done by manipulating the syringe so as to move the needle back and forth. If the needle is in the mass, the mass will move as it does. By following this technique, one can become adept at hitting masses that are only a few millimeters in diameter and are deeply placed in the breast.

Excision of the mass is recommended if (a) it is solid, (b) bloody fluid is obtained, or (c) the mass does not disappear after aspiration. These contingencies are explained to the patient beforehand and the aspiration is not done unless she promises to abide by these principles.

The patient is asked to return in approximately two weeks after the procedure. This, too, she must promise beforehand. At the time of her return, the breast is carefully examined again. If at this time there is suspicion that the mass has not entirely disappeared, breast biopsy is recommended. However, if there is no evidence of the mass, the patient is carefully instructed in self-examination of the breasts and is given a U. S. Public Health Service pamphlet (No. 48) on breast self-examination. She is instructed to return immediately if there is any question in her mind about a new mass. In any event, she is asked to return in three months for further examination and for review of her ability to examine her own breasts. At the end of the three months' period she is advised to return for breast examination every six months.

Many of these patients do return with more cysts. Blue dome cysts ordinarily do not have an epithelial lining, but sometimes the old cysts reaccumulate fluid. Aspiration is done in exactly the same manner as was done originally.

Many tense cysts feel extremely hard and may be thought to be fibroadenomas or carcinomas. The use of the needle is an excellent method of differentiating between a solid mass and a cystic mass. It is important that the physician ultimately responsible for the treatment of the patient be the one who employs this diagnostic procedure. His judgment cannot be perfect unless he is personally aware of all the pertinent findings such as the character of the mass before aspiration, the appearance of any fluid obtained and the character of any residual suspicious tissue.

MATERIAL

Eighty patients with definite masses were examined by the needle aspiration technique and were observed for one to eight years afterward. Fluid was obtained from the masses in 41 patients varying in age from 34 years to 57 years, the average being 41 years. Thirty-four of the 41 patients required no procedure but aspiration. However, many of them have had multiple cyst aspirations. In four of the patients the mass did not entirely disappear; breast biopsy was done and cystic disease was found. In one case Papanicolaou examination of the fluid obtained was equivocal. The patient was operated upon and cystic disease was present. In two patients the fluid was bloody; these patients were both operated upon and intracystic papillary disease was found.

In 39 patients the mass was solid, no fluid being aspirated, and breast biopsy was done. Twenty-one of these patients had a fibroadenoma and two a fibrolipoma. The average age of these patients was 39 years. Five of the patients with solid masses were found to have fibrocystic disease, and the other had sclerosing adenosis. One patient had physiological hyperplasia of the breast due to pregnancy, and one patient did not return for biopsy as instructed. She was the only patient in the series who was lost to observation. Eight of the patients had carcinoma—in each instance a small lesion which could have been a fibroadenoma or a cyst. The average age of patients was 49 years.

Among the patients with cysts, from one to four cysts were aspirated on the first visit. Fifteen patients (36 per cent) returned for further aspirations. One of these patients had 21 aspirations. Finally, because of the patient's worry about her breasts and the necessity for frequent office visits for aspiration, she and her husband decided that she would prefer

TABLE 1.—*Reports of Aspiration of Breast Cysts Since 1899*

Author	Year	No. of Patients	Patients with Cancer of Breast	
Bull[2]	1899	14	0	
Abbe[1]	1903	41	0	
Mathews[17]	1936	50	0	
VandenBerg[24]	1946	57	1	(opposite breast)
Fitts and Donald[6]	1949	22	0	
Saltzstein and Pollock[21]	1949	9	0	
Kilgore and coworkers[15]	1953	150	1	(same breast—not in cyst)
			1	(in cyst)
Patey and Nurrick[19]	1953	65	1	(opposite breast)
Johnston[14]	1954	45	0	
Goode and coworkers[9]	1955	202	0	
Gould[10]	1955	122	1	(opposite breast)
			1	(same breast—not in cyst)
			1	(in cyst)
Rosemond[20]	1955	150	1	(opposite breast)
			1	(same breast—not in cyst)
			2	(in cyst)
Hendrick[11]	1958	167	0	
Olch[18]	1959	229	1	(same breast—not in cyst)
Gaspar	1960	41	0	
		1364	12	(4—opposite breast)
				(4—same breast—not in cyst)
				(4—in cyst)

to have a bilateral simple mastectomy. This was done. Careful pathological examination of the breasts showed cystic disease only.

In addition to the one patient who had 21 aspirations, one patient had 17 aspirations, two patients had 13, one had nine and two patients had eight. Three patients had aspirations on four occasions; three patients on three occasions; and two patients on two occasions.

From 0.3 to 60 milliliters of fluid was obtained from individual cysts. The average cyst contained approximately seven milliliters of fluid. In color, the fluid varied from slightly opalescent pale, greyish to dark green and turbid. Papanicolaou examination of aspirated fluid was done in 19 cases. Usually they were reported as showing some granular debris and a few degenerated epithelial cells. Cells that were interpreted as being suspicious of carcinoma were seen in one specimen. Because of this, biopsy was done. A cyst with a mild inflammatory reaction in its wall was found. As Papanicolaou examination of cyst fluid generally has been unrewarding, this procedure has been abandoned.

When the tumors were solid, strong traction was applied to the plunger of the syringe in an effort to draw tissue juice into the needle. If juice was obtained, it was smeared on a slide and a Papanicolaou stain was made. In one instance this showed cells typical of carcinoma. In other instances it was not helpful.

COLLECTED SERIES

Table 1 shows the reports of cyst aspiration that have been made since Bull's first report in 1899, a total of 1,364 cases. In 12 of these cases (0.88 per cent) carcinoma was found—four times within the cyst, four times in the same breast as that containing the cyst but not in the area of the cyst, and four times in the opposite breast. Dublin (cited by Copeland)[4,5] said that the incidence of breast carcinoma in women in general, age not considered, was 0.42 per cent. Inasmuch as the average age of the patients with cysts in the present series was 41 years, which is comparable with that in other reported series, it is probable that the incidence of carcinoma in this age group would be considerably higher than 0.42 per cent. Hodge and coworkers[12] reported that the incidence of development of breast carcinoma in the adult female population is greater than 2.1 per cent and nearer 4.0 per cent.[13]

The important point is that in 1,364 women who had breast cysts aspirated, apparently no carcinomatous tumors were missed. In fact, I have found no report of a case in which carcinoma was missed because of aspiration of a breast cyst. Rosemond[20] reported that in the two cases in which he found a carcinoma within a cyst, the malignant lesion possibly was discovered earlier than it might otherwise have been. (The possibility would seem to be a slim one, however, for if aspiration had not been done, biopsy surely would have been carried out because of the presence of the mass.) It is possible that there are unreported cases in which carcinoma was overlooked in patients who had cyst aspiration. If such cases exist, they should be reported. However, it is extremely unlikely that such cases occur if the rules previously laid down are strictly followed—especially, the rule that the physician must satisfy himself the mass has entirely disappeared after aspiration of the cyst.

ECONOMIC CONSIDERATIONS

In 1959, the U. S. Defense Department[23] published data on the actual cost of dealing with various diseases and procedures in hospital under the Medicare Program. Breast biopsy was listed as costing $200. This included the normal charges of the surgeon, anesthesiologist, hospital and laboratory. No comparable data on the cost of cyst aspiration are available, but undoubtedly many physicians are carrying out the procedure in their offices daily—at a considerable saving to the patient.

RELATION BETWEEN CYSTIC DISEASE AND CARCINOMA

Although the present study was not designed to elucidate the relationship between breast carcinoma and cystic disease, it is inevitable that this aspect must be considered in order to give intelligent counsel to patients. The question has been debated in the surgical literature for years. Most observers seem convinced that the possibility of breast carcinoma developing in a group of women with cystic disease is somewhat larger than in a similar age group without cystic disease.

Warren,[25] in a monumental study, concluded that the expected rate of cancer development in women with cystic disease was 4.5 times as great as in women without cystic disease. Clagett and coworkers[3] arrived at a very similar figure. Lewison and Lyons,[16] in a good study of 385 women with benign breast disease followed for an average of 13.6 years, found seven carcinomas, an incidence of 1.8 per cent. One hundred and fifty-three of the women had chronic cystic mastitis, and four of these had carcinoma, an incidence of 2.6 per cent. This was calculated as being from 2.6 to 3.6 times as great an incidence of carcinoma as the expected rate. Frantz and associates,[7] in an excellent study of 225 postmortem examinations found an incidence of chronic mastitis of 52 per cent.

Statistical studies of this sort are very difficult to make and to interpret. They depend so much upon the sample of the population studied and the analytical methods used. An exact answer to the problem can probably never be made unless a large number of women with cystic disease, perhaps a thousand or more, are observed for their lifetime with careful microscopic examination of the breasts at surgical operation or after death. They would have to be compared with a similar group of women without cystic disease. This seems an impossible task.

I tend to agree with Stout,[22] who said: "The writer is not yet ready to accept the reported increased rate as settled until the actual breast carcinoma development rate in the female population is on a firmer basis. The writer does not wish to leave the impression that he does not believe that cystic disease with hyperplasia does not provide a more favorable condition for the development of carcinoma of the breast than its absence—he simply wishes to indicate that he has not yet been offered proof convincing to him that this is so."

INTRACYSTIC CARCINOMA OF THE BREAST

Intracystic carcinoma of the breast is a rather rare lesion that has not been reported upon frequently, although usually mentioned in pathological texts. Gatchell, Dockerty and Clagett[8] observed 48 such lesions in 9,000 cases of breast carcinoma at the Mayo Clinic over a 35-year period. This was an incidence of 0.5 per cent. They were studying pathological specimens and consequently did not mention the type of fluid contained within the cyst. However, the cysts varied in size from 1.5 to 10 cm. in diameter. Intracystic carcinoma tended to be somewhat less malignant than the usual carcinoma; the five-year survival rate was 83 per cent. Almost certainly this type of carcinoma would not be missed by aspiration if the rules previously laid down were carefully followed.

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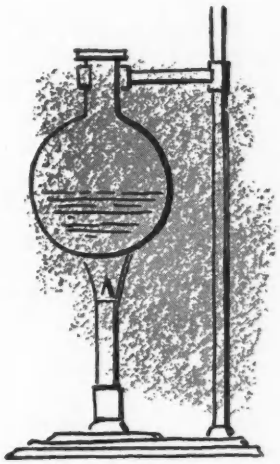

Closed System Administration of Fluothane®*

GRANT FLETCHER, *M.D.*, Monterey

• **Fluothane® was administered in a closed system to 518 surgical patients. No morbidity or mortality was attributable to using Fluothane by this technique. Requisites for safe administration of Fluothane in a closed system include (1) an understanding of the basic concepts of closed systems, (2) a vaporizer outside of the breathing circuit which will accurately and dependably deliver precise amounts (in a range of 10 to 60 cc.) of oxygen saturated with Fluothane, and (3) a thermally stable vaporizer.**

If the demands for safe operation are met, Fluothane anesthesia with the closed system technique becomes the simplest, most economical and effective method for general anesthesia in adults.

THE INTRODUCTION of Fluothane® by Raventos[14] and Johnstone[9] in 1956 made available a potent nonexplosive anesthetic agent. It was made available for use in the United States in 1958. Many clinical and laboratory reports have confirmed its usefulness, advantages and hazards. Ability to control the inspired concentration of Fluothane over a very narrow range is the most critical factor in its safe administration. In order to meet this requirement most investigators have stressed the use of nonrebreathing or partial rebreathing systems, and special vaporizers have been developed for this purpose.[8,13,16] The objections to these high flow inhalation techniques are that they are costly and wasteful of gases and Fluothane, that they are too complex and that the constantly full anesthesia bag makes it difficult to judge the patient's respiratory exchange. Since other potent anesthetic agents are administered safely in closed rebreathing systems, there would not appear to be any reason why Fluothane could not also be administered in this manner. This paper reviews the author's experience with administration of Fluothane in a completely closed rebreathing system in 518 consecutive cases.

METHODS

Patients were premedicated with scopolamine (0.2 to 0.4 mg.) and in most instances 25 to 50 mg. of meperidine. In elderly patients, atropine was sometimes substituted for scopolamine. Thiopental sodium (75 to 250 mg.) intravenously was used to facilitate induction, and was followed by a 4-liter flow of 2 to 4 per cent Fluothane in oxygen. Surgical anesthesia was usually achieved in 3 to 7 minutes. Single doses of succinylcholine (30 to 60 mg.) or Flaxedil®† (up to 0.5 mg. per pound of body weight) were used only to facilitate tracheal intubation or relaxation for upper abdominal operations. At the completion of induction or intubation, the oxygen flow was reduced to basal metabolic requirements (100 to 250 cc. per minute) with Fluothane added as required. Respirations were manually assisted in most patients.

Foregger anesthetic machines with "copper kettles"[12] and circle filters of jumbo type were used. Oxygen flowmeters to the "copper kettles" were specifically selected to provide easy readability, in increments of 5 cc., of flows from 5 to 80 cc. per minute, and increments of 25 cc. from 80 cc. to 350 cc. per minute. Performance of the vaporizers was monitored with an oxygen analyzer (Beckman) and a thermistor indicating thermometer. During vaporization the temperature of the "kettles" did not vary significantly from room temperature, and the outflow at 20°C. contained 34 per cent Fluothane. This is in agreement with the findings of Feldman and Morris for similar apparatus.[6]

Blood pressure was estimated by the oscillometric method. Cardiac rate and rhythm were continuously monitored with a cardioscope in 399 cases, and with a stethoscope in the remainder.

CLINICAL MATERIALS

The patients in this study were dealt with in the author's private practice of anesthesiology in two small general hospitals. Included were all patients to whom Fluothane was administered in a closed system during the years 1959 and 1960. During this period the only patients receiving general anesthesia by other techniques or agents were children under 10 years of age, obstetrical patients and patients whose operations were expected to last less than 30 minutes.

The patients ranged in age from 4 to 92 years and were classified according to physical status

*A brand of 1,1,1, Trifluoro-2,2, bromochlorethane.

Presented before the Section on Anesthesiology at the 90th Annual Session of the California Medical Association, Los Angeles, April 30 to May 3, 1961.

†Flaxedil is a brand of gallamine triethiodide.

TABLE 1.—*Data on Patients Undergoing Fluothane Anesthesia in a Closed System, by Age and Physical Status (Risk).*

Age	Number of Patients	Physical Status of Patients: A.S.A. Classification	Number of Patients in Class
0 to 5 years	2	1	219
6 to 10 years	8	2	174
11 to 20 years	56	3	42
21 to 30 years	56	4	0
31 to 40 years	92	5	61
41 to 50 years	103	6	22
51 to 60 years	77		
61 to 70 years	83		518
Over 70 years	41		
Total	518		

(American Society of Anesthesiologists classification), 1 through 6 (Table 1). Preoperative complications which did not preclude the use of general anesthesia, did not preclude the use of Fluothane. The most common preoperative complications were respiratory diseases, and secondly diseases of the cardiovascular system. Hypovolemia was not considered a contraindication to the use of Fluothane.

Surgical procedures of all types, with the exception of obstetrical operations, on all sites of the body were included in the series (Table 2). The duration of anesthesia ranged from 20 minutes to 8 hours; in most cases it was between 1 and 3 hours (Table 3).

RESULTS

Induction. Induction was smooth, rapid and noticeably lacking in laryngospasm, stridor or excess secretions. Surgical levels of anesthesia were achieved in 3 to 7 minutes, but pharyngeal and laryngeal reflexes were obtunded early. Tracheal intubation could be carried out in 5 to 10 minutes with Fluothane alone, and in a shorter time if succinylcholine or Flaxedil was used. The time available for tracheal intubation with Fluothane alone is rather brief, and the use of relaxants eases the job and reduces the incidence of "bucking" on the tube.

Maintenance. During maintenance the flow of oxygen was set at the estimated basal metabolic

TABLE 3.—*Duration of Anesthesia with Fluothane in a Closed System.*

Duration of Anesthesia	Patients: Number	Per Cent
0 to ½ hour	8	1.5
½ to 1 hour	82	16
1 to 2 hours	191	37
2 to 3 hours	157	30
3 to 4 hours	52	10
Over 4 hours	28	5.5
Total	518	100.0

requirements of 100 to 250 cc. per minute, and oxygen with Fluothane was added from the "copper kettle" as indicated by clinical demand. In the vast majority of patients a flow of 20 to 40 cc. of oxygen through the "kettle" would suffice to provide a steady level of surgical anesthesia throughout operation. Maintenance rates varied, however, from 10 cc. to 60 cc. per minute. The only consistent indicator of deepening anesthesia was a fall in blood pressure, and even this was misleading if there was minimal surgical stimulation. In general, changes in the rate of Fluothane administration were minimal once operation was under way. Excellent operating conditions were provided in every case, and it was never necessary to abandon the use of Fluothane or add another anesthetic agent. Fluothane was discontinued during the last 20 minutes of operation or after the peritoneum was closed. Patients generally had return of pharyngeal reflexes by the end of the procedure and responded to vocal commands within the first postoperative half hour.

Muscular relaxation. Sufficient relaxation for tracheal intubation and for all operative procedure except in the upper abdomen could readily be produced with Fluothane alone. A saving of about 4 minutes in the induction to intubation time could be gained with the use of relaxant drugs, and therefore 215 of the 288 patients intubated received such an agent (Table 4).

Succinylcholine in a single dose of 30 to 60 mg. was given before intubation in cases in which not much relaxation would be required for the op-

TABLE 2.—*Data on Patients Undergoing Fluothane Anesthesia in a Closed System, as to Surgical Service and Site of Operation.*

	Head Neck	Trunk	Thorax	Abdomen	Perineum	Extremity	
SERVICE:	142	75	24	171	32	74	Totals
Eye	5	....	....	....	....	....	5
ENT	99	....	....	....	....	....	99
Plastic	13	4	....	....	....	11	28
Neurosurgical	10	9	....	....	....	....	19
Urological	....	7	....	2	22	....	31
General	15	54	4	142	3	17	235
Thoracic	....	....	20	....	....	....	20
Orthopedic	....	1	....	....	....	46	47
Gynecological	....	....	....	27	7	....	34

TABLE 4.—*Use of Tracheal Intubation and Muscle Relaxants as Related to Site of Operations in Patients Undergoing Fluothane Anesthesia in a Closed System.*

Site of Operation	Number of Patients	Number Intubated	Succinylcholine	Flaxedil
Head-neck	142	142	76	3
Trunk	75	19	8	6
Thorax	24	24	6	12
Abdomen	171	98	14	86
Perineum	32	0	0	3
Extremity	74	5	4	0
Totals	518	288	108	110

TABLE 5.—*Relationship of Age to the Occurrence of Arterial Systolic Hypotension with a Fall of Greater than 25 per cent in Systolic Pressure.*

Age of Patients	Number of Patients	Number with Hypotension	Per Cent with Hypotension
0 to 10 years	10	0	0
11 to 20 years	56	0	0
21 to 30 years	56	3	5
31 to 40 years	92	4	5
41 to 50 years	103	8	8
51 to 60 years	77	14	18
61 to 70 years	83	25	33
Over 70 years	41	9	20
Total	518	63	12% (Average)

eration, and Flaxedil in single doses of less than 0.5 mg. per pound of body weight was administered if the procedure was to necessitate considerable relaxation. Of 110 patients receiving Flaxedil, 95 had upper abdominal or thoracoabdominal operations. The tachycardia from these doses of Flaxedil was helpful in reducing the tendency toward bradycardia due to Fluothane. Pulse rates over 120 per minute were rarely seen and usually subsided within 20 minutes.

Repeated doses of either Flaxedil or succinylcholine were not given, and the effect of the relaxant was completely gone by the termination of the procedure. Antagonists were never indicated or used, and no cases of postanesthetic muscle depression were noted. Closure of abdominal incisions was possible with Fluothane alone in every case.

Secretions. There was a notable lack of salivary and bronchial secretions, as is usual with Fluothane anesthesia. The extreme dryness of the mucosa required special attention to the lubrication of airways to prevent mucosal tearing. Need for preoperative and early postoperative suction was almost eliminated.

Respiratory effects. In levels of anesthesia used in this series there was an apparent decrease in spontaneous minute ventilation except in very light levels. There was a tendency toward tachypnea when surgical stimulation was severe. Assisted or controlled ventilation was used in most patients throughout anesthesia. Posthypercapnic hypotension was not observed.

Patients with emphysema or asthma tolerated Fluothane anesthesia well. Bronchospasm present before induction usually disappeared during Fluothane anesthesia. In no case did bronchospasm appear or get worse during anesthesia.

Cardiovascular effects. A decrease in systolic blood pressure of 10 to 20 per cent below the preanesthetic level almost always accompanied induction. This usually rapidly reversed after intubation or upon surgical stimulation. During maintenance, the systolic blood pressure was usually stable at about 10 per cent below the preanesthetic level. Hypotension, when it occurred, usually came on gradually, except when induced by traction reflexes. Hypertension was uncommon and never persisted more than 20 minutes.

Falls in systolic pressure greater than 25 per cent of the preanesthetic level and lasting more than 5 minutes occurred in 12 per cent of the patients (Table 5). While in many instances the occurrence of hypotension per se was directly related to the concentration of the anesthetic agent, the patient's age and vascular reactivity were major factors. Profound hypotension occurred five times more frequently in patients over 60 years (24 per cent) than in patients below 60 years (5 per cent).

In a majority of cases a reduction in the concentration caused a return of systolic pressure to acceptable levels. In upper abdominal operations, severe hypotension was usually due to traction reflexes and was reversed when manipulation lessened. Atropine was given intravenously in 12 instances, but was only effective when the hypotension was associated with bradycardia from traction reflexes. Methoxamine, 5 mg. was given intravenously in three cases and was effective in reversing the hypotension when all other measures had failed. In no case did a systolic pressure stay below 70 mm. of mercury for more than 10 minutes. Patients who did have pronounced hypotension throughout a major portion of the period of anesthesia did not show evidence of "shock," and their skin remained pink, warm and dry. There were no evidences of permanent effects due to hypotensive episodes.

In all patients the systolic blood pressure was near preanesthetic levels at the termination of anesthesia. Postoperative hypotension was rare, and oliguria related to hypotension did not occur.

Bradycardia of a degree was present in most patients in surgical levels of anesthesia, unless they had received Flaxedil. Severe bradycardia (less than 48 per minute) occurred in 12 patients. In six cases it was associated with the rapid injection of succinylcholine for tracheal intubation, and in two of

the six the pulse rate was 12 per minute for about 2 minutes. In all these patients the rate returned to normal levels after intubation without specific therapy. In the remaining six cases the bradycardia was associated with visceral traction reflexes; in four instances it reverted spontaneously and in two it responded to intravenous atropine.

Electrocardiographic effects. In 399 patients the electrocardiogram was continuously monitored with a cardioscope. Downward displacement of the pacemaker intermittently was so common as to be considered routine, but no other supraventricular arrhythmia developed during anesthesia. Preexisting auricular fibrillation was not affected by Fluothane.

Ventricular arrhythmia occurred in 42 patients. In five cases the abnormality was multifocal ventricular extrasystoles, and in the remaining 37 there were either coupled ventricular extrasystoles or single extrasystoles occurring at intervals, apparently from a single focus.

In 21 cases the occurrence of ventricular extrasystoles was related to tracheal intubation, an incidence of 7 per cent of those intubated. Usually this aberration was of short duration, and regular rhythm reappeared as soon as ventilation improved and the anesthetic level deepened.

The remaining cases of ventricular arrhythmia were associated with traction reflex phenomena or underventilation or both. The effect of underventilation was dramatic, and ventricular extrasystoles in some patients could be started or stopped by altering the degree of ventilatory assistance. In only two instances was arrhythmia associated with hypotension and in both these cases it was also associated with traction reflexes. In general, arrhythmia seemed to be a benign phenomenon. In no case was drug therapy used to stop it.

The use of epinephrine solutions. Epinephrine in a 1:100,000 concentration was injected for local hemostasis in 61 patients. Volumes injected were between 5 and 10 cc. and injections were not repeated within one hour. There was no evidence in any case of a disturbance of cardiac rhythm or of any cardiovascular effect related to epinephrine.

Morbidity and mortality. There were no operating room deaths and no case of "cardiac arrest." One death within the first 24 hours after operation was due to massive cerebral anoxia during carotid endarterectomy. There were two other deaths within the first postoperative week but they were not related to the use of Fluothane or the closed system technique.

Toxic effects on the liver or kidney were not evident although the series included patients with significant liver and kidney disease.

COMMENT

During the initial period of administration of Fluothane the uptake from the inspired gases is rapid. Within 20 minutes the rate of uptake falls rapidly to a low plateau at which it is continued for many hours.[4,11] This initial rapid fall in uptake is due to the amounts needed for the saturation of the blood and of tissues high in water content. The use of rapid flow techniques of administering Fluothane during this phase serves the double purpose of providing the large volume of Fluothane required to achieve saturation without using very high concentrations, and of denitrogenating the patient before changing to the closed system.

After the initial saturation, the rate of uptake continues a steady slow rate as the Fluothane is lost from the blood into the tissues, mainly the fat.[4,11,15] Because of the high degree of transferability of Fluothane from water to oils, this outflow to the tissues will go on for at least a hundred hours, with the agent at the same concentration in the inspired air, before the saturation point of fat tissue is approached. For practical purposes of clinical anesthesia, the uptake of Fluothane during anesthesia maintenance will be steady, and addition of an equal amount of Fluothane from the vaporizer to a closed system should maintain an even level of concentration in the inspired air. Because of the small and fixed rate of outflow to the tissues, small changes in the inflow of Fluothane from the vaporizer will cause relatively large changes in concentration within a short period of time.[13]

In the average adult, the total uptake of Fluothane vapor during steady anesthesia is 15 cc. per minute at an inspired concentration of 1.5 per cent.[1,13,15] This is the amount of Fluothane vapor emitted by a "copper kettle" when 30 cc. of oxygen is flowed through it at 20°C.[6] Abajian,[1] Robson and coworkers[15] and Mushin,[13] using infrared absorption techniques of measuring Fluothane concentration, showed that with this amount of Fluothane added continuously to a closed system, the concentration of Fluothane in the inspired gas will remain constant. They found no evidence of a sudden build-up of concentration, even after several hours of administration. The author found no clinical evidence of such build-up in the present series.

Reports of sudden profound and often unexpected hypotension occurring frequently during closed system administration of Fluothane[5,7] have been the result of the use of standard vaporizers, vaporizers in the breathing circuit or vaporizers not specifically calibrated for low flow techniques. Control of the concentration of Fluothane can only be achieved if there is absolute control of the flow of gas through the vaporizer. This requires that the vaporizer be

outside the breathing circuit.[16] In order to provide for variations from patient to patient, and within the same patient during the closed system administration of Fluothane, the flow of oxygen through a "copper kettle" must be finely adjustable within a range of 5 to 60 cc. per minute.

When the necessary criteria for control are met, as detailed above, then Fluothane anesthesia in a closed system is not associated with any more frequent complications than are other techniques.[1,2,16] The incidence of hypotension is related more to the agent per se than to the technique of administration. The influence of age and of traction reflexes in the occurrence of hypotension is not limited to Fluothane; these influences are factors with any anesthetic agent. The fact that postanesthetic sequelae due to the hypotension associated with Fluothane anesthesia have not been any greater than with other anesthetic agents suggests that existing criteria for safe levels of systolic blood pressure during Fluothane anesthesia may need to be revised downward.

That there is a relationship between pharyngeal manipulation or tracheal intubation and cardiac arrhythmia has been well established. It is not surprising that the same would hold true, as the present report indicates, of Fluothane anesthesia.[10] The role of underventilation in the production of ventricular arrhythmias, as described by Black,[3] was quite evident in some patients in this series. During Fluothane anesthesia, ventricular arrhythmia seldom occurs at times of hypotension, suggesting that a high level of circulating catechol amines is necessary for its occurrence. This would be in conformity with the proven sensitization of the myocardium to catechol amines that occurs with Fluothane and other halogenated hydrocarbons.[14]

While the author does not advocate the indiscriminate use of epinephrine during Fluothane anesthesia, personal experience in this series and an additional 140 cases not included here indicates that its use is not absolutely contraindicated. Use of not more than 10 cc. of 1:100,000 epinephrine (or the equivalent of another concentration) will not result in demonstrable undesirable effects.

Finally in an era of rapidly rising costs of medical care it is gratifying to be able to introduce savings. The cost of supplying oxygen and Fluothane in a closed system is about 50 cents an hour; the cost of nitrous-oxide-oxygen Fluothane mixture at 4 liters per minute is about $2.50 an hour.

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Histamine Metabolism

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• **Some recent discoveries about the formation, storage and catabolism of histamine are reviewed. Histamine is formed by decarboxylation of histidine and stored principally in the mast cells of connective tissue. Human lung and facial skin are particularly rich in histamine. When histamine is injected intravenously, simulating spontaneous release, it is rapidly metabolized and excreted.**

THERE IS GENERAL AGREEMENT that histamine is involved in a number of biological phenomena. For this reason scientific interest in histamine continues after more than fifty years of study. This paper is intended to provide a review of some recent discoveries about the formation, storage and catabolism of histamine.

Histamine is produced by the enzymatic decarboxylation of the amino acid *histidine*. In experimental animals less than 10 per cent of injected histidine and less than 1 per cent of ingested histidine is converted to tissue histamine. This newly formed intracellular histamine is released slowly from the tissues, with a biological half-life of about 50 days.[9] Since only a small portion of ingested histidine is converted to histamine, the supply of histidine in the diet has little effect on stores of histamine in tissues.[4]

A wide variety of organisms possess the enzyme *histidine decarboxylase* which catalyzes this conversion. Bacterial histidine decarboxylase is responsible for the appearance of histamine in putrefying organic matter such as the rotted ergot from which Barger and Dale isolated histamine as the biologically active material in 1910.[1] The concentration of histamine in animal tissues parallels local concentrations of histidine decarboxylase; and the histidine decarboxylase activity can be correlated with tissue mast cell concentration.[5] Histamine formation by human cells was recently demonstrated by Hartman, using basophils from humans with myelogenous leukemia.[7]

Large species differences have been found in the histamine content of mammalian tissues. Some animals, like the dog, have most of their histamine in mast cells in the connective tissue capsules of visceral organs. Others, like the rat, have most of their histamine in the mast cells of skin and subcutaneous tissues. The rabbit is unique in that relatively large amounts of histamine are found in the platelets. Thus, generalizations from experimental animal studies must be made with caution.

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The cellular histamine is found within the mast cell granules with a concentration of about 25 $\mu\mu$gm per cell in ox liver capsule.[8] Rat mast cells contain an average of 32 $\mu\mu$gm per cell.[3] Most human mast cells are in connective tissues, the number varying from 20 to 120 cells per five high power fields. Chronic inflammation increases and acute inflammation decreases the number of mast cells seen.

Graham and coworkers[6] carefully measured the distribution of histamine among the various formed elements of human blood. By far the greatest concentration (1 $\mu\mu$gm per cell) was found in basophils, much lower than that of tissue mast cells. The high blood histamine levels observed in chronic myelocytic leukemia have been correlated with a high basophil content.[12] Data on other human tissues are comparatively sparse. The highest tissue concentrations are found in facial skin (30.4 μgm per gm), lung (33 μgm per gm), stomach (14 μgm per gm) and duodenum (14 μgm per gm).

After its intracellular formation (by histidine decarboxylase) histamine remains inactive within mast cell granules even after cellular disruption and differential ultracentrifugation. Three hypotheses as to the nature of this intracellular binding have been presented. Peptide bonds to protein, ionic bonds to heparin, or binding or adsorption to lecithin may be involved. Heparin and histamine will form a precipitate *in vitro* which resembles the mast cell granules. Conversely, lecithinase activation seems to be instrumental in producing histamine release. At present, the mode of binding remains unknown.

The degradation of endogenous histamine following its release from cellular stores has not been directly studied due to the technical difficulties involved. Instead, most studies have involved the intravenous or subcutaneous injection of trace amounts of histamine. Isotopic labeling of histamine has aided the identification of metabolites.

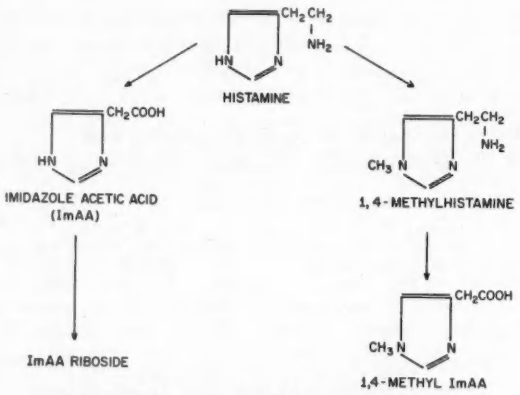

Figure 1. Pathways of histamine catabolism.

Injected radioactive histamine is rapidly cleared from the plasma and the metabolic products are rapidly excreted in the urine.[2] There is no appreciable ring-splitting or respiratory excretion of radioactive carbon dioxide after injection. When small amounts are injected, very little unchanged histamine appears in the urine. We gave 100 μgm of radioactive histamine intravenously to humans and found that the plasma was cleared of radioactivity in a few minutes; 70 per cent or more of the administered radioactivity had been excreted into the urine within 24 hours, and all within 48 hours. Less than 5 per cent of this was unchanged histamine.

There are two main pathways of histamine catabolism (Figure 1). First, histamine may be oxidized to imidazole-4(5)-acetic acid (ImAA) through imidazole-4(5)-acetaldehyde. Much of the resulting ImAA is then conjugated with ribose, leading to urinary excretion of both ImAA and ImAA riboside.[11] In the second pathway, histamine is methylated at the ring imino-nitrogen to form 1,4-methyl-histamine. This is followed by oxidation of the side chain, presumably through the corresponding aldehyde to 1,4 methylimidazoleactic acid (me-ImAA).

There is some species variation in the amounts of the various radioactive metabolic products that are excreted following administration of radioactive histamine. In humans apparently both pathways of catabolism are used. Schayer[10] found most of the radioactive histamine excreted as me-ImAA by healthy young males.[10] Our studies with a group of hospital patients and normal males demonstrated ImAA as the principal metabolite.[2] There were no consistent variations in the amounts of the metabolites found in patients with asthma, "histamine" headaches or Laennec's cirrhosis.

The catabolism of histamine is thus a process which proceeds rapidly and completely and there is no evidence that it is ever altered significantly *in vivo* in man. Histamine metabolizing enzymes remain surprisingly active even in extensive parenchymatous diseases.

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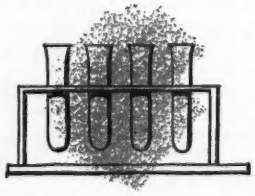

Operations in Upper Extremity Amputees

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• **The surgeon is obligated to prepare the patient mentally as well as physically for amputation. Acceptance of his loss by the patient, his family and contemporaries is important in his adjustment to his environment. He must provide the best stump possible, direct the postoperative shrinking and conditioning of the stump, prescribe the prosthetic device best suited to the needs of the individual, make sure it fits and functions, and that the patient is instructed in its maximum use.**

There are definite indications for ablation of a part. All possible length in the upper extremity should be preserved.

Amputation in children with congenital deformities should usually be postponed until demanded by the family. The growth centers should be preserved if feasible. Congenital upper extremity amputees should ordinarily be fitted within the first two years.

Neuromata, spurs, redundant tissue, scars, and phantom pain should generally be treated by other than surgical methods. Revisions, including cineplasty, should be undertaken only after careful study and when there are clear indications that benefit to patient will ensue.

IN AMPUTATION of a limb, the surgical procedure is a relatively minor part of treating the patient. Before ablation the surgeon must help the patient to prepare himself mentally for the impact his loss will entail. After operation he must supervise stump conditioning. With the aid of the prosthetist and the amputee trainer (sometimes job counselor, engineer, psychiatrist or plastic surgeon) he will prescribe the prosthesis best suited to the needs of the patient and insure adequate instruction in how to use it.

Children who have had amputations of an upper extremity should be fitted with a prosthetic device early—within the first two years in most instances. Also, every effort must be made to preserve the growth centers proximal to the site of amputation. Growth in a deformed and less useful arm is invariably slower than that on the normal side. In general, it is advisable to preserve as much as possible and to postpone the operation as long as possible. Another good general rule in this connection is to permit the family (with the help of good medical advice) to decide when the time for removal has arrived.

SURGICAL PRINCIPLES

Prerequisites of a good amputation stump are that it have: (1) A covering of healthy, full-thickness skin without painful scars. A muscle pad about the bone, but not protruding more than ½ inch beyond the end of the bone. (2) Normal sensation. (3) Good muscle control and joint function. (4) No bony prominences or nerve endings that can be traumatized by a prosthetic device. (5) As much length as possible. One cannot always provide all these desirable features, but there must be a sufficient reason for the omission if the surgeon does not do so. The primary operation may be definitive or not, as circumstances dictate. In the presence of infection or potential infection it is usually best to do a modified guillotine amputation, with secondary closure later. In all other circumstances a single procedure, with formation of adequate skin flaps and primary closure, is done. The techniques of the various standard operative procedures will not be dwelt upon here.

SITES OF ELECTION

For many years the standard works on amputation and prosthesis of the upper extremities emphasized the necessity for making the stumps within the areas designated as "sites of election" in midarm and midforearm. Amputation through other areas was discouraged, primarily because no functional prosthetic devices were available for limbs amputated at other sites. Since the inception of the government-sponsored prosthetic research program in 1945, many new components and techniques in the fabrication, fitting and alignment of upper extremity prostheses have removed this major objection to amputation through formerly avoided regions.

Time was that transcarpal amputation, wrist disarticulation and amputation through the lower third of the forearm were not done because they necessi-

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From the Orthopaedic Hospital, the Orthopaedic Service of the Veterans' Administration Hospital (Wadsworth), and the University of California Medical Center, Los Angeles 24.

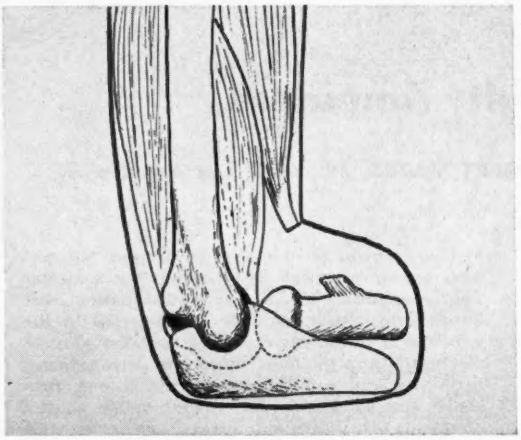

Figure 1.—Section of the insertion of the biceps tendon produces a relative increase in stump length. (By permission of J. of Bone & Joint Surg.)

tated use of a socket that would have made the arm longer than the normal opposite forearm. The wrist adaptors that are now available, however, permit fabrication of forearm sockets that obviate this undesirable asymmetry, yet make possible the preservation of wrist flexion and rotation. Preservation of the lower forearm and carpus whenever possible is also desirable. It is advisable when doing wrist disarticulations to excise the styloid process of ulna and radius. If this is not done the thin skin over these may be irritated by the socket of the prosthetic device.

The upper third of the forearm has previously been regarded as an area which could not be fitted suitably, because it was too short adequately to hold a forearm socket. The newer devices permit adequate functional fitting in this area. Blair and Morris[2] sectioned the biceps insertion in very short stumps to give a relative increase in stump length and permit higher fitting of the socket in the antecubital area for better stability and function. (Figure 1). Disarticulation through the elbow joint has been frowned upon because of the difficulty of fitting a prosthetic limb over the flaring condyles, and the necessity for a socket longer than that of the normal opposite arm. Newer techniques, the outside locking elbow joint, and the step-up elbow hinge have obviated these objections (Figure 2).

The range of function of an above-elbow prosthetic arm is directly proportional to the length, strength and the range of motion of the retained humeral lever. Preservation of as long a lever as possible is therefore desirable. Until recently, however, any stump with less than two inches of humerus distal to the axillary fold could not be fitted and harnessed functionally. It is now possible to do this. In very high arm amputations, retention of the

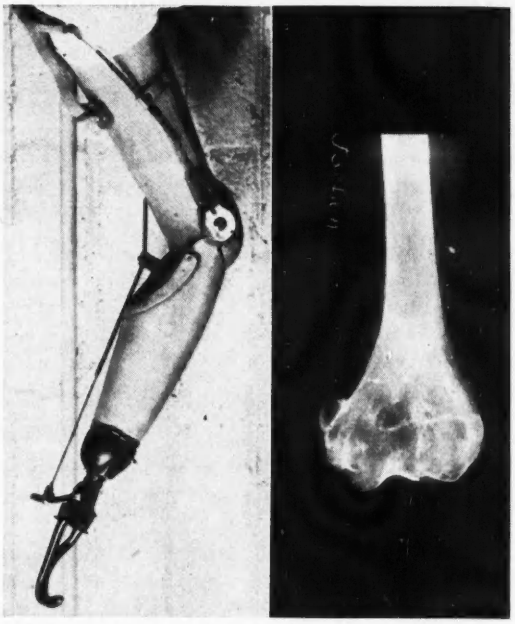

Figure 2.—On the left is the elbow disarticulation prosthesis with outside locking elbow hinge; on the right, the x-ray of the elbow disarticulation. (By permission of J. of Bone & Joint Surg.)

head of the humerus is desirable for cosmetic reasons, and because it permits a firmer grip of prosthesis on shoulder girdle, thereby increasing security and minimizing rotation of prosthesis about the shoulder.

The successful fitting of many persons who had amputations through the so-called undesirable areas with appliances and techniques developed in recent years, has demonstrated that the concept of "sites of election" in upper extremity amputations is obsolete.[5,7] Amputation operations on an upper extremity should be directed toward saving all possible length in all areas. Prosthetic consideration need not dictate an amputation site. Physical factors, such as skin coverage, adequacy of circulation, good innervation, and function of the part to be saved should be the determining factors in deciding the level of amputations (Chart 1).

Secondary closure is necessary when amputation of the guillotine type is used. It is occasionally necessary to trim off bony prominences or redundant soft tissue in order to form a better stump. Bony prominences such as the anterior crest of tibia are easily irritated by a prosthetic socket. Rarely is redundant soft tissue an indication for revision, for allowance can be made for it when tailoring the socket. Long-standing, persistent drainage and failure of the wound to close, however, are reason for excision of infected tissue secondarily.

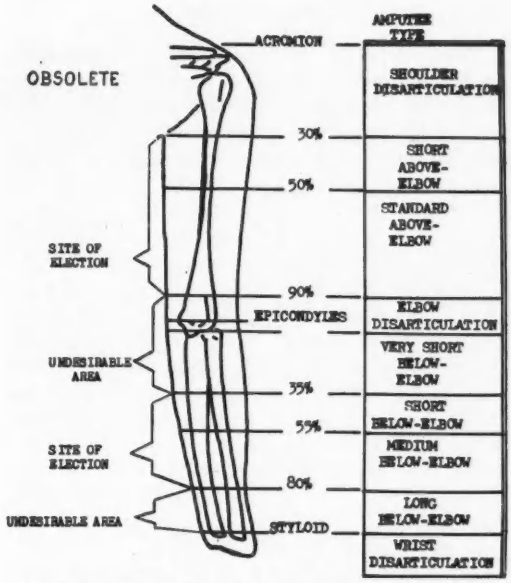

Chart 1.—On the left, the old "sites of election" and "undesirable areas" are shown. On the right, prosthetic designations for amputations at various levels.

CINEPLASTY

Since the second world war, there has been a revival of interest in ways to activate prosthetic devices by contraction of a skin-lined muscle tunnel. A number of studies have been made of the efficacy of cineplasty, and they have shown rather conclusively that this operation is of value in only a few amputees. Brav[3] reviewed 78 cases of cineplastic operations on biceps and 29 on pectoral muscles and found 70 per cent of the biceps tunnels and 35 per cent of the pectoral tunnels "successful." In the author's[8] series, 19 of 27 or 70 per cent of biceps tunnels gave satisfactory use and service to the amputee, as did 6 of 12 or 50 per cent of pectoral tunnels. Of two triceps and 15 forearm tunnels, none functioned. Except in very rare circumstances, therefore, only the biceps cineplasty in below-elbow stumps is worthwhile.

The advantages of biceps cineplasty are: (1) There is greater range of motion of the prosthesis; (2) the axilla loop used in harnessing of a standard prosthesis is not needed; (3) deep proprioceptive sensation is restored, which enables the amputee to "feel" the location of the terminal device; (4) there is improved performance of fine hook or finger motion.

Patients should be carefully selected for cineplasty. They should be mature, well adjusted, persevering and well motivated persons who will cooperate in learning to use the prosthetic device. They should have seen others who have had cineplasty and they should want the operation. They should have done well with a conventional prosthesis for at least six months.

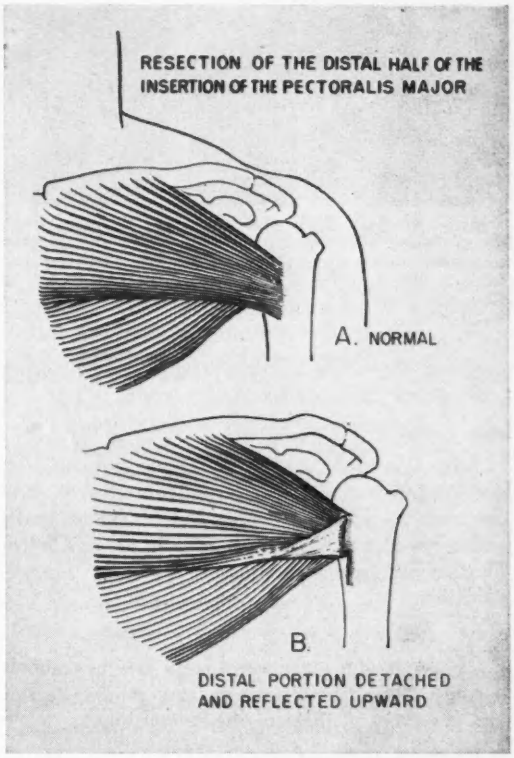
RESECTION OF THE DISTAL HALF OF THE INSERTION OF THE PECTORALIS MAJOR
A. NORMAL
B.
DISTAL PORTION DETACHED AND REFLECTED UPWARD

Figure 3.—Reflection of the lower half of the insertion of the pectoralis major produces a relative increase in stump length. (By permission of the J. of Bone & Joint Surg.)

Stump Lengthening

There are two types of stump in which efforts to increase length may be justified:

1. A well-formed but very short below-elbow or above-elbow with good sensation and muscle power, in which fitting, or function or both could be improved by additional length. In these instances, provided the patient understands his problems, wants to be a good prosthetic user, and does not expect too much from the operation, section of the biceps insertion into the radius, or reflection of the insertion of the pectoralis major[8] into the humerus, will provide some increase of relative length and function. (See Figure 3.)

2. In stumps with good skin and muscle power, where the humerus is considerably shorter than the redundant soft tissue hanging from it. Implantation of a fibular graft into the end of the humerus has been attempted in a few instances.[12,13] In these cases resorption of much of the transplant has

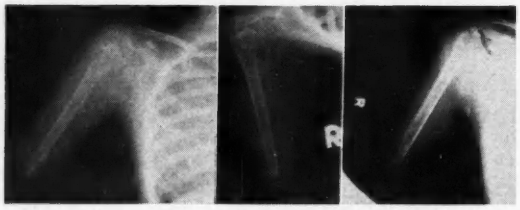

Figure 4.—*Left:* X-ray film taken May 25, 1959, shows the sharp end of the humerus almost penetrating the skin in a 10-year-old congenital amputee. *Center:* The resected bone is shown in the film of August 21, 1959. *Right:* A film taken July 27, 1960, shows re-overgrowth of the humerus.

occurred. The slight increase of length and function is of questionable value.

Skin Grafts

Split skin used to obtain closure of infected stumps does not withstand prosthetic use well. It is desirable to replace it with a full thickness graft, which obviates ulceration of the skin, permits better function of prosthesis and provides more normal sensation.

Scars

Painful, tender or adherent scars may be traumatized by the artificial arm or may inhibit its full use. Resection of these is often rewarding.

Bony Overgrowth and Spurs

In children, the humerus and the tibia may grow faster than the surrounding soft tissue, stretching it and bringing about ulceration through the stump end. This may occur even in congenital cases. Shortening of the overgrown bone is necessary[4] and may have to be done more than once if overgrowth recurs (Figure 4). Spurs practically never cause enough trouble in upper extremity amputees to necessitate removing them.

Neuromata

Too many operations are done for "removal of neuromata." It is not unusual for a high-strung or hypersensitive amputee to have pain which he relates to the cut end of a nerve trunk. The area may be tender. Usually in such cases, excision of the neuroma is followed by a couple of months' relief from pain. Then the patient's boss takes him to task for something, or his wife wants a new fur coat, and the pain returns, being now referred to another nerve end or to the same nerve higher up. Resection of neuromata rarely results in permanent relief. Local procaine injection, application of heat or cold, sometimes intravenous pentothal or procaine, may help. Psychiatric evaluation is usually indicated.[6] In children a significant number of painful neuromata, uncomplicated by psychic problems, have been removed with good relief.[1]

PHANTOM PAIN

Phantom pain is not a problem in congenital amputees or those who have had traumatic amputation in the first decade of life. Traumatic amputations during the second decade may be followed by phantom sensation, but almost never pain. In adults, phantom sensation is practically universal, pain fortunately rare. The pain studies by the Amputee Research Group at the University of California, Berkeley, have elucidated some instructive facts.[11]

Phantom pain manifests itself in a variety of ways. The missing part frequently moves into a more proximal location than it normally inhabits. The painful sensations may take the form of burning pain or the feeling of having red hot pins stuck into it. The toes or heel may feel as though squeezed in a vice, struck by a hammer or twisted into a grotesque deformed shape, or there may be agonizing muscle cramps. There may be only a tingling of finger or toe.

Approximately 30 per cent of amputees have no phantom pain. In about 5 per cent it is very severe.

Treatment is as has been outlined under neuromata.

Re-amputation is futile.

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Staffing Ratios in a Rehabilitation Program

JOHN E. AFFELDT, *M.D.*, Downey

• **Staffing ratios for professional personnel functioning in an intensive physical rehabilitation program at Rancho Los Amigos Hospital, representing experience with treatment of patients with severe physical disabilities on the one hand and budget pressures and procedures on the other, are as follows:**

Physician to patients	**1:33**
Nursing service per patient per day (including registered nurse, licensed vocational nurse, attendant)	**4 hours**
Physical therapy to patients	**1:7**
Occupational therapy to patients	**1:14**
Medical social service to patients	**1:35**
Psychology or vocational counselor to patients (needing service)	**1:35**

On January 1, 1961 the State Department of Social Welfare of California put into effect a program to pay for physical rehabilitation services for the Old Age Security recipients in facilities certified by the State Department of Public Health.[1] This program is part of the state's implementation of the Kerr-Mills bill passed by the Congress of the United States September 13, 1960, known as the "Social Security Amendments of 1960."

The payment of cost of rehabilitation should enable many persons needing this service to obtain it and, in turn, enable hospitals to develop such programs to meet the need. It is the intent and hope of the state that these services be made available in both public and private facilities, distributed as widely throughout the state as possible.

The standards for certification of a rehabilitation facility[2] follow patterns well established by functioning programs and facilities throughout the country. They require the services of professional personnel to include physicians, nurses, physical and occupational therapists, medical social workers and clinical psychologists. The published criteria list the professional requirements of these personnel. However, the standards do not attempt to establish numbers of staff required in a program.

Planning and budgeting for the numbers and types of personnel needed can be handled in any of several ways. Personnel may be added as needs arise or staffing ratios may be used where the types, numbers and severity of disabilities to be treated are adequately predictable.

Administrators, whether of hospital or medical background, have varying opinions of the value of staffing ratios or formulae. Some consider them useful in developing work loads and budgets, and for planning programs. Others, believing they are misleading, unnecessarily rigid or arbitrary, prefer not to use them.

At Rancho Los Amigos Hospital, staffing ratios are used in some services but not in others, depending upon the size and degree of definition of duties within the service. Experience to date with their use encourages us to continue. The ratios used have for the most part been developed within our own experience. These represent the multitudinous influences of budgeting and programming at work in our particular environment. They cannot and should not be considered rigid patterns for use in other rehabilitation programs. They can, however, be used for comparison with other programs or as possible guides to new programs being established.

It is the purpose of this paper to present the staffing ratios used at the Rancho Los Amigos Hospital in the physical rehabilitation program, as a resource for hospitals who may be seeking such information for their own planning purposes.

Medical Staffing

A ratio of physicians to patients is difficult to establish, will vary widely between hospitals and can be very misleading. Consequently we do not use it for establishing positions for staff physicians; rather, we define a medical need and then establish the position. We can, however, arrive at an experience figure by relating the number of full-time physicians serving a given number of patients on the rehabilitation program. With this approach, our ratio turns out to be approximately one physician to 33 patients. This is misleading, however, because one physician does not confine his activities to a geographically confined group of 33 patients. The physician staff is composed of generalists and specialists, each performing specified service for a given patient. The generalist provides the day-to-day general medical care, the internist the special med-

From the Rancho Los Amigos Hospital, Downey, and the Department of Internal Medicine, Loma Linda University, Los Angeles 33.

ical guidance and the orthopedist or physiatrist the reconstructive or physical restorative aspects. All share these responsibilities for a specific patient.

This approach differs from that of most general hospitals, where one physician has a specified group of patients. He either calls a consultant in or transfers the patient to another service to achieve needed specialist services. However, the ratio of 1:33 is reasonably close to that of general hospital experience, where the ratios are between 1:20 and 1:30. The ratio cited in our program does not include numerous consultants who visit for guidance, teaching or special consultative purposes.

Nursing

Our nursing ratios are based on the number of hours of nursing service rendered a patient in a 24-hour period. We use different ratios in different areas of the program, the areas being defined by severity or type of disability. The ratio includes three classes of nursing personnel—registered nurse, licensed vocational nurse and attendant. The ratio excludes supervisory personnel, from the head nurse upward. It also excludes whatever clerical and educational personnel are used within the service. Through means of the ratio, the numbers and classifications of patients thus determine the number of nursing service personnel. This nursing personnel number is then distributed between professional and nonprofessional persons on a 25:75 ratio, 25 per cent professional (includes only the registered nurse) and 75 per cent nonprofessional.

The basic nursing formula used within our rehabilitation program is four hours of nursing service per 24 hours per patient. This formula is applied to a group of adult patients in a defined area of the hospital where patients are transferred for the specific purpose of engaging in an intensive program of rehabilitation. The patient group includes those with such diseases or conditions as spinal cord injury resulting in either paraplegia or quadriplegia, severe rheumatoid arthritis, amputation, hemiplegia, advanced multiple sclerosis and a variety of other neuromuscular disabilities. The average length of stay in this program for a patient is six months.

Several specifically defined rehabilitation patient groups receive nursing care beyond the basic four hours per 24 hours. They are as follows:

	Hours
A. Respirator patients (patients using a mechanical respirator for support of respiration)	10.3
B. Paralytic poliomyelitis patients (nonrespirator)	6.5
C. Children with severe forms of various paralytic, neuromuscular or congenital disabilities	5.0

The nursing support in the long-term care program of the hospital apart from the intensive rehabilitation program varies between 0.9 and 1.75 hours per 24 hours per patient.

Physical Therapy

The physical therapy staff operates with a ratio of approximately one physical therapist to seven patients. This ratio, as in nursing, excludes the top supervisory, instructor and clerical personnel. The number of staff allowed by the formula is further divided into professional and nonprofessional personnel in approximately 50:50 ratio. The professionals are registered physical therapists and the nonprofessionals are attendants. Physical therapists began using attendants at our hospital some seven or eight years ago, relatively few at first, then gradually increasing to the present 50:50 proportion.

Need for the use of nonprofessional personnel grew from the chronic shortage of registered physical therapists; and now that the therapists have learned how to train and supervise nonprofessional help, have become accustomed to it and have overcome whatever misgivings they may have had about the threat to their own job security; they would no longer care to be without attendant workers on their staff. This experience parallels that of the nursing service with regard to the use of nurses' aides.

Occupational Therapy

The occupational therapy staff uses a ratio of one staff person to 14 patients. As in physical therapy and nursing the ratio includes professional and nonprofessional (attendant) personnel. This distribution is approximately three registered therapists to one attendant. The use of attendants is more recent in occupational therapy than in physical therapy, but the acceptance and use of their help followed the same pattern of development noted with regard to the other staffs already mentioned.

Medical Social Service

For medical social service the staffing formula is one professional worker to 35 patients. This ratio excludes the head of the department. It also excludes admissions workers whose particular assignments are the determination of financial eligibility for admission to a county facility. This department has just begun to use the services of two nonprofessional persons assisting the social worker with some of the more routine duties. Thus far the experience is good.

Psychological and Vocational Services

Psychologists and vocational counselors are both needed in a rehabilitation program. We have integrated these two functions and personnel into one department because of the close relationship between psychological evaluation or testing and vocational guidance or counseling. We have further attempted to combine these two functions into the same person in order to achieve flexibility of staff and to minimize further staff specialization. Approximately 60 per cent of the patients on a rehabilitation program

will require the intensive services of the psychologist-vocational counselor. The average time spent with a patient during a period of six months in hospital is approximately 40 hours. A formula of one psychologist or vocational counselor to 35 patients needing service (60 per cent of the patients in the intensive program need it) will adequately supply the service. This group of professional personnel supply psychological testing, psychotherapy and vocational counseling.

A prevocational testing clinic has been developed within this service. Experience over the past four years indicates that approximately 50 per cent of the rehabilitation patients will have need of this facility, each requiring 25 to 30 hours of service.

There are various other services or activities used in a rehabilitation program, but they are either of a nature not suitable to the working out of a staffing formula or we have not yet attempted to apply one.

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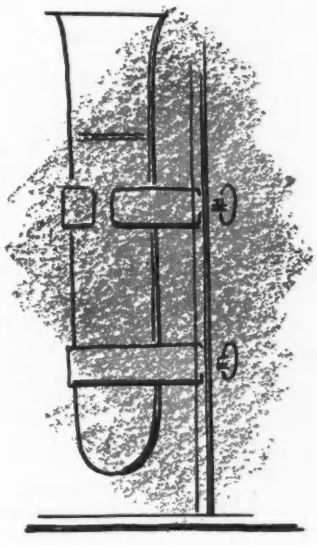

CASE REPORTS

Pulmonary Granulomatosis Associated with Excessive Use of Cosmetic Sprays

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ANDREW J. McQUEENEY, M.D., Santa Barbara, and
SAMUEL C. SILIPO, M.D., Miami, Florida

LITTLE REFERENCE has been made in the medical literature to the possibility that pulmonary granulomatosis may be associated with the use of cosmetic or astringent sprays on the hair or body. In March of 1958, Bergmann and coworkers,[1] reporting on observations in two patients, suggested that hair sprays are not altogether harmless. Both of the patients were women in their twenties. One of them had been using various hair sprays for about two years, the last six months of which she had been in the habit of spraying her hair twice daily. The second patient had been using hair spray daily for three years. In both cases x-ray films showed extensive and widespread infiltrative changes, and there were surprisingly few associated respiratory signs or symptoms in either patient. In both instances the roentgenographically visible lesions disappeared spontaneously about three months after discontinuation of the use of hair spray.

In one patient, the microscopic finding of para-aminosalicylic acid-positive cytoplasmic inclusions in the histiocytic granulomatous infiltrate of a biopsy specimen of a scalene node convinced Bergmann and his associates that the lesion was distinctly different from those of sarcoidosis. This discovery stimulated them to study the effects following subcutaneous injections of a residue suspension from a well known brand of hair spray into the inguinal regions of three guinea pigs. Microscopic study of the lesions produced in all three animals revealed the characteristic para-aminosalicylic acid-positive granules in foam cells scattered throughout the granulomatous process. From this finding and other microscopic changes they concluded that the injected hair-spray residue acted like a typical macromolecular substance.

Bergmann[2] said that since the publication of their article in 1958, they have seen similar conditions in a number of cases, which are to be reported.

From the Departments of Pulmonary Diseases and Pathology, Santa Barbara General Hospital, Santa Barbara.

Submitted March 27, 1961.

In the following case the history, the physical findings, the radiographic changes and the results of tissue examination were strikingly like those in the two cases reported by Bergmann and coworkers.

REPORT OF A CASE

The patient, a 29-year-old woman, was admitted to the Santa Barbara General Hospital on June 1, 1959, because of extensive bilateral lung lesions, somewhat suggestive of tuberculosis, observed on a routine radiograph of the chest (Figure 1) taken May 29, 1959, as part of a gynecologic examination. A routine 70 mm. minifilm (Figure 2) taken May 1, 1957, showed no such changes. A 14x17 film taken on June 11, 1959, and a right lateral film (Figure 3) showed the same extensive bilateral symmetrical pulmonary infiltration of multicentric configuration.

The patient was employed as a nurses' aide at another hospital. On admission she had no significant symptoms referable to the respiratory tract and considered herself to be in good health. She said she frequently danced for an entire evening without feeling short of breath, and her weight had remained constant at 110 to 113 pounds since 1956.

In January of 1959 she had a mild upper respiratory tract infection of two weeks' duration, characterized by hoarseness, slight productive cough and fever not exceeding 99.8° F.

On specific questioning (after a pathologic report on biopsy material indicated this line of questioning) she said that she had been using various body, room and hair sprays since 1954. Between 1957 and 1959 she used five different cosmetic sprays extensively and concurrently. She was in the habit of spraying her body daily after bathing, and on returning from work, she invariably sprayed her room heavily with cologne.

No significant abnormalities were observed on physical examination. Response to a skin test with tuberculin intermediate strength purified protein derivative was negative; with a second strength PPD it was 2-plus at the end of 48 hours. Results of tests with histoplasmin and coccidioidin in various dilutions were negative. Results of urinalysis, blood cell counts and hematocrit and hemoglobin determinations were all within normal limits, as were serum calcium, total and fractional serum protein, alkaline phosphorus and nonprotein nitrogen and the results of a bromsulfthalein test. The erythrocyte

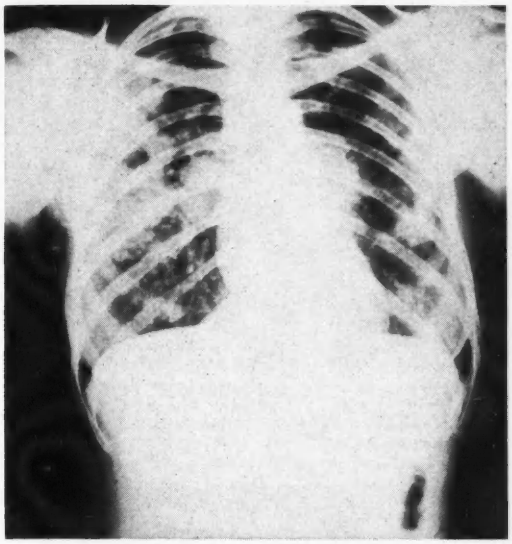

Figure 1.—Routine chest roentgenogram obtained on May 29, 1959, two days before admission to the hospital, showing extensive and diffuse bilateral granulomatous infiltrate. The patient was asymptomatic.

sedimentation rate (Wintrobe) was 32 mm. in one hour and remained rapid throughout the hospital stay. The result of a cephalin flocculation test was 2-plus at 24 hours and 4-plus at 48 hours; and results were the same later during the time the patient remained in the hospital. Fourteen consecutive 24-hour sputum specimens were negative for acid-fast bacilli on slides and culture, as were three specimens of gastric washings. Three fresh sputum specimens submitted for culture for predominating organisms were negative for pathogenic forms. However, the patient had very little sputum for examination.

The patient received no antibiotics or antituberculous drug therapy at the beginning of the period in hospital. Because of the response to the tuberculin test and the radiographic observations, it was decided to keep her under observation in the hospital. On June 17, 1959, her temperature was 103° F. for a 24-hour period and she complained of a severe sore throat. The vessels of the pharynx were decidedly engorged. The patient was given 400,000 units of penicillin-V by mouth five times daily and 250 mg. of oxytetracycline four times daily for five days. At the end of this period the pharyngeal symptoms had subsided and the temperature had returned to normal. X-ray films of the chest taken July 23, July 31 and August 20 showed no change. Films of the hands and feet, taken June 15, showed no abnormality.

Results of ventilatory function studies carried out in June and July, 1959, were within normal limits.

Biopsy of a specimen of scalene lymph node on June 18 showed noncaseating granulomatous lymphadenitis (Figure 4). The pathologic report on a

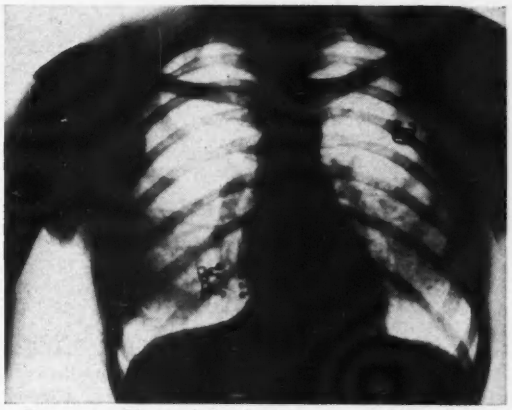

Figure 2.—Photograph of a 70 mm. minifilm obtained on May 1, 1957. This radiogram was interpreted as being within normal limits.

Figure 3.—Right lateral chest roentgenogram obtained on June 11, 1959. This film shows the distribution of the infiltrates and the apparently normal upper mediastinum.

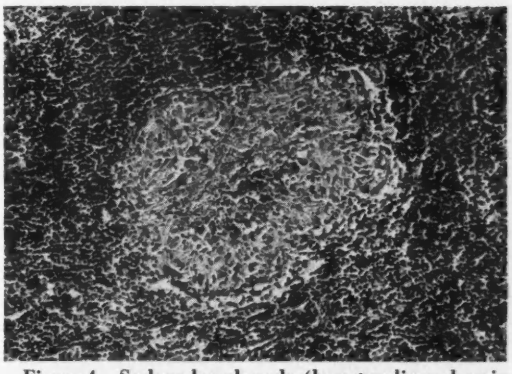

Figure 4.—Scalene lymph node (hematoxylin and eosin stain, reduced from ×450). Noncaseating granulomatous focus associated with bilateral pulmonary granulomatosis.

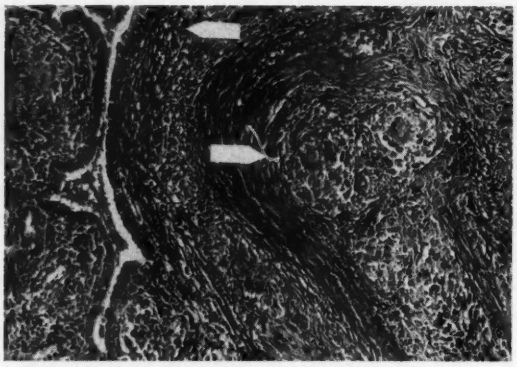

Figure 5.—Specimen of lung tissue (hematoxylin-eosin stain, reduced from ×450), showing pulmonary granulomatosis. Peribronchial infiltrate (arrow, left) and confluent granulomatous foci with marginal fibrosis (arrow, right).

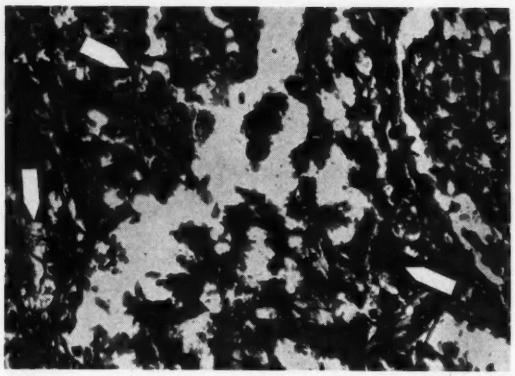

Figure 6.—Specimen of lung tissue (periodic acid-Schiff stain, ×970). PAS-positive cytoplasmic inclusions in granulomatous pulmonary infiltrate, obscuring nuclear detail at lower right.

specimen of lung tissue taken for biopsy August 17 follows:

"*Microscopic.* The pleural surface of the lung was covered with a thin film of fibrinous exudate. The pulmonary parenchyma was replaced by a diffuse granulomatous inflammatory process characterized by the presence of multiple granulomata that were confluent in many areas, obliterating the normal alveolar pattern (Figure 5). Individual granulomata showed epithelioid cell infiltration and occasional multinucleate giant cells of Langhans type, with no evidence of caseation necrosis. There was slight interstitial pulmonary fibrosis. Terminal bronchioles and occasional groups of alveoli were dilated and filled with pooled eosinophilic pink material containing numerous histiocytes. Further examination showed cytoplasmic pink granules within many histiocytes. Periodic acid stains showed these to represent clusters of foam cells with PAS-positive cytoplasmic granules (Figure 6). Small numbers of similar phagocytes containing PAS-positive material were distributed throughout the granulomatous foci. No fungi were demonstrated. Acid-fast stains showed no acid-fast bacilli. Grocott stains for fungi are negative.

"*Diagnosis.* Pulmonary granulomatosis, consistent with 'hair-spray granuloma.'

"*Comment.* The microscopic appearance is identical with that produced experimentally by Bergmann and coworkers by subcutaneous injection of a well-known brand of hair-spray. Pulmonary infiltration is so extensive in the biopsy material that liver involvement is probable."

It was after this report was received that questioning of the patient brought to light the excessive exposure to spray-type cosmetics, and she was thereupon discharged from the hospital with advice to discontinue exposure to sprays. She returned to work as a nurses' aide and reported regularly to our outpatient chest clinic for follow-up examinations.

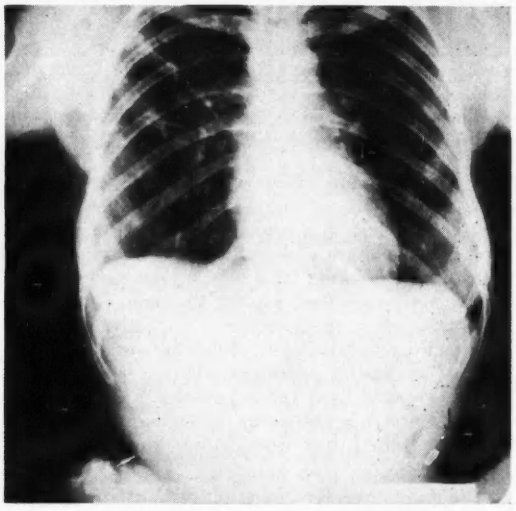

Figure 7.—Chest roentgenogram taken November 9, 1960, six months following the film shown in Figure 4. Note the dramatic clearing of the granulomatous infiltrates which took place between 12 and 18 months after the patient discontinued the use of body spray.

She was given no treatment and remained asymptomatic. X-ray films of the chest were taken from time to time and it was not until November, 1960, more than a year after the patient was discharged from the hospital, that significant diminution in the extensive pulmonary granulomatous process was shown (Figure 7).

The erythrocyte sedimentation rate still was above the normal range. However, the result of a cephalin flocculation test on February 1, 1961, was normal.

The patient remained well and continued to work. Ventilatory pulmonary function studies carried out February 1, 1961, were still essentially normal. The patient said she had not used cosmetic sprays for 21 months.

DISCUSSION

There is an element of uncertainty in suggesting that the pulmonary granulomatosis (thesaurosis) in this case was produced by the excessive use of body sprays. It is regrettable that qualitative tests for polyvinylpyrrolidone were not performed on the lung tissue removed for biopsy. Bergmann[2] said he considers this test necessary for an absolutely certain diagnosis, as he and his coworkers have apparently incriminated this ingredient by chemical analysis of various sprays as responsible for the changes evoked by prolonged inhalation.

The pathologic changes suggesting the diagnosis are shown in Figures 5 and 6. The lesion is practically indistinguishable microscopically from sarcoidosis except for the presence of the PAS-positive granules in the histiocytes. These granules were seen in all the cases Bergmann[2] observed. It is significant that we were unable to demonstrate similar PAS-positive granules in specimens from known cases of sarcoidosis selected from our pathologic files. In view of these observations, and in the absence of other possible etiologic agents, the history of excessive exposure to spray type cosmetics certainly seems more than coincidental.

It is noteworthy that in the present case more than a year elapsed before the pulmonary lesions cleared, whereas it took an average of only three months after discontinuance of sprays in the two cases originally reported by Bergmann.[1] Our impression following correspondence with Bergmann, however, is that the lung reaction in the present case was pathologically and radiographically more extensive and intensive than in most of the cases he observed.

The virtual complete resolution of the lesions on the radiograms is by no means specific for thesaurosis. However, this degree of resolution without steroid therapy would be regarded as most unusual in extensive pulmonary sarcoidosis, which in our opinion is now the only significant entity to be considered in the differential diagnosis.

Obviously more data must be accumulated regarding this probable entity before final conclusions can be drawn.

SUMMARY

In a case of diffuse bilateral pulmonary granulomatosis, the lesions disappeared without therapy approximately 14 months after the patient stopped using cosmetic body spray that she had previously used often. Scalene node biopsy and lung biopsy revealed a granulomatous reaction identical with that previously described following the use of hair spray. This factor should be considered in patients with asymptomatic pulmonary disease.

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Hemolytic Disease of the Newborn Due to Sensitization to the Blood Factor hr'

HERMAN W. HYATT, SR., *M.D.*, Bakersfield

SINCE THE DISCOVERY of the hr′ factor by Levine in 1941,[5] approximately 30 articles concerning hemolytic disease of the newborn due to sensitization to this factor have appeared in the literature.

In view of the relative infrequency of hemolytic disease of the newborn related to maternal sensitization to the hr′ factor it seems important to report the following case.

REPORT OF A CASE

The patient, obese, 37 years of age, gravida IX, para V, abortus III, was admitted to Kern County (California) General Hospital on June 1, 1960. The expected date of confinement was June 17, 1960. None of her five living children, whose birth weights had ranged from 7 pounds to 9 pounds 8 ounces, had jaundice in the newborn period and all were well. In none of the three cases in which abortion occurred did gestation continue more than a few weeks and the cause of abortion was not known.

The patient had received three blood transfusions —January 25, 1950, after an abortion; September 27, 1957, and September 28, 1957, for postpartum hemorrhage. Since there was a family history of diabetes mellitus a glucose tolerance test was done May 27, 1960. The results were indicative of latent diabetes mellitus. A 1200-calorie diet was prescribed and the patient was observed regularly in the Diabetic Clinic. Blood sugar content remained within normal limits during that time.

On June 3 the patient was delivered of a 9-pound 3-ounce edematous girl with grayish-blue discoloration of the body that was attributed to a somewhat difficult delivery. Cyanosis of the face was also noted. Studies of the infant's blood done the next morning showed a positive reaction to a Coombs test; serum bilirubin of 23.7 mg. per 100 cc.; hemoglobin, 15.3 gm. per 100 cc.; hematocrit, 53 per cent; 3 nucleated red blood cells per 100 white blood cells. The blood was typed as Group O, Rh_0-positive, hr′-positive. The mother's blood was Group B, Rh_0-positive, hr′-negative. It was believed that the infant had hemolytic disease of the newborn due to maternal sensitization to the hr′ factor. An exchange transfusion was done, using 500 cc. of Group O, Rh_0-positive, hr′-negative blood and the infant tolerated the procedure well. The bilirubin was 24.6 mg. per 100 cc. before the exchange and 13.6 mg. after it. On the morning of June 5, 1960 the bilirubin was 22.4 mg. per 100 cc. A second exchange transfusion was done, using 500 cc. of Group O, Rh_0-positive, hr′-negative blood, without incidence. The bilirubin content was 25.6 mg. per 100 cc. before and 14.6 mg. after the exchange. On the morning of June 6, 1960, the bilirubin was 21.4 mg. per 100 cc., the

Submitted May 9, 1961.

hemoglobin concentration was 12.8 gm. per 100 cc. and the hematocrit 41 per cent. At 2:30 p.m. the bilirubin was 21.5 mg. and at 8:30 p.m. it was 20 mg. per 100 cc. At 8:00 a.m. June 7, 1960, bilirubin content was 13.7 mg. per 100 cc. The patient was less edematous and the intensity of the jaundice had decreased. Her condition rapidly improved over the next few days. On June 13, 1960, the hemoglobin concentration was 10.6 gm. per 100 cc. and the hematocrit 37 per cent. The baby was discharged June 14, 1960, with prescription of Similac® with iron.

When last observed, in April, 1961, the patient had normal physical and mental development.

It was not possible to determine the anti-hr′ titer of the mother in the latter months of pregnancy in order to detect any rise in titer. However, since it was felt that hemolytic disease in this infant was due to hr′ sensitization, serological studies were done. Blood was drawn from the mother, father and four younger children. (The two older sons, ages 16 and 17, were not available.) The mother's anti-hr′ titer of 1:32 gave serological confirmation of the original impression. It is likely that the titer would have been higher if the blood had been drawn in June 1960. Results of the blood studies* are shown in the table below.

							Most Probable Rh Genotype	
		ABO	Rh Factors				Fisher-Race Termi-	Wiener Termi-
Subject	Age	Type	D	C	E	e	nology	nology
Father	40 years	A	+	+	—	+	CDe/cde	R^1r
Mother	37 years	B	+	+	—	—	CDe/CDe	R^1R^1
Sister	12 years	O	+	+	—	+	CDe/cde	R^1r
Brother	7 years	O	+	+	—	—	CDe/CDe	R^1R^1
Sister	3 years	B	+	+	—	—	CDe/CDe	R^1R^1
Patient	3 mo.	O	+	+	—	+	CDe/cde	R^1r

DISCUSSION

The Hr factors are weakly antigenic and consequently only rarely cause antibody formation. However, maternal sensitization to these factors probably occurs more often than is realized. Of the Hr factors, hr′ is the most antigenic and consequently most often stimulates antibody formation. In fact in the Rh-Hr system, hr′ is the most common cause, after Rh_0, of sensitization in pregnancy.[11]

Although it is commonly believed that hemolytic disease due to sensitization to the hr′ factor is mild, it is important to note that many cases of such sensitization reported in the literature were so severe that death resulted. [1-4,6-10,12]

*Done by the Brentwood Laboratories, Los Angeles, California.

The blood transfusions the mother had received earlier may have played some role in sensitizing her to the hr′ factor, although this cannot be substantiated, since Hr typing was not done on the blood she received.

SUMMARY

A case of hemolytic disease of the newborn due to maternal sensitization to the hr′ factor is presented.

Although hemolytic disease of the newborn due to hr′ sensitization is uncommon, such sensitization probably occurs more frequently than is supposed.

Of the Rh-Hr blood factors, hr′ is, after Rh_0, the most common cause of sensitization in pregnancy.

Although some cases of hemolytic disease of the newborn due to the hr′ factor may be mild, other cases may be so severe as to cause death.

Blood transfusions, as well as previous pregnancies, may play a role in sensitizing the mother to the hr′ factor.

618 California Avenue, Bakersfield.

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EDITORIAL

The Newer Research

SCIENCE IS ON THE MARCH. All we need do to appreciate this fact is to read our daily papers, where stress is constantly laid on the need for more scientific education, the need for more people trained in the sciences, the need to surpass other countries in our scientific progress.

It has been said, probably with reason, that there has been more scientific progress in the past decade than in all recorded history before that period.

With this upsurge we have even learned a new language. We speak of thermonuclear couplings as though such words were commonplace, where a bit of reflection will show that until recently such words were used in the generic sense and not in connection with modern weapons of industry or of war.

Medicine has shared in this swing. Medical science has advanced along with the other sciences, to the point where the older physician today must take to the textbooks or admit to his own failure to keep abreast of modern practices. We are all aware of the advances in drug production, the synthesis of this or that or the other element, the development of new and potent drugs for therapeutic use undreamed of only a few years ago.

Unlike many of the other professions, however, medicine remains largely a person-to-person profession. It is not dominated by government programming and spending, such as we see in physics and other sciences. Medicine remains a science for the care and treatment of individuals, performing a service which is more effective today because of scientific advances but still based on the concept of one physician to care for one patient. The modalities of such care may advance but the concept of the manner of care remains pretty constant.

In short, the practice of medicine has not been reduced to assembly line methods. This statement might not hold true in all instances, such as some closed-panel approaches, but it is fundamentally the method by which most physicians treat most patients, person to person.

From the patient's point of view, however, some aspects of the practice of medicine have changed. Chief among these is the manner of payment for services which are admittedly more effective today than at any time in the past but are also more expensive. From this fact has come the tremendous growth of the voluntary health insurance movement as a means of allowing the patient to budget the cost of his medical needs.

This is one of the social aspects of medical practice today. It is also one of the economic aspects. It has nothing to do with the practice of medicine, but an easy connection can be made from scientific advances to the need for social and economic advances.

Once this link is forged between science and the humanities of social science and economic need, it seems obvious that the medical profession must solve the humanistic elements of today's environment. Once solved, these elements must be transmitted to the practitioners whose individual activities are so closely tied in with the subject matter.

It is on this basis that the California Medical Association several years ago established a Bureau of Research and Planning. This bureau was envisaged as a center which might look into the myriad elements contributing to good or bad medical practice, to the well-being and satisfaction of patients, to the quality of medical care and of those who render such care.

The new bureau of the California Medical Association represents the first department of its type in the country. It is making studies directly aimed at the subjects in its agenda. And, even more important, it is making the results of these studies available for general publication and available to the physicians who can profit by such investigations. Its works may be less expansive than we could expect

from a government agency but they will be more readable and more available. The bureau approach is to produce socioeconomic reports that are authoritative and that may be expanded if there is enough interest and reason for doing so.

One distinct advantage of the C.M.A. approach is its inherent flexibility. A subject which may reflect a great interest today may be studied today, not next month or next year. Its personnel are trained to assemble and use known statistics, to develop their own where needed, and to come out with a brief report which is understandable, practical and readable. Any such report which needs expansion may be expanded; if the report indicates an area which is insoluble or sterile, further studies may be discontinued.

The bureau's main job is to get the facts, get them quickly, report them in readable language and, where possible, offer recommendations.

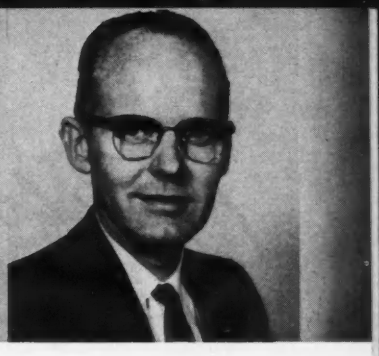
This type of information has not heretofore been available to any large number of physicians or to their organizations. The speed and flexibility with which the bureau can operate have never before been known.

As to subjects, the agenda of the bureau is practically limitless. So many elements enter into good medical practice that a study of each, in depth and with authority, is a never-ending job. Add the advances that occur from day to day, and there seems no limit to researches which may be carried on in the interest of better medicine.

Members of the California Medical Association have already seen some of the research results produced by this bureau. Others are in preparation and will be seen increasingly in the months to come. Under way are a study of the characteristics of physicians and a survey of miscellaneous plans under which medical care is provided. Two additional reports have been completed and are soon to be published in these pages—one on the cost of hospitalization and the other on the supply of physicians. Now being planned is a conference on the quality of medical care.

The Council of the California Medical Association is to be congratulated on its forward-thinking proposal to establish this bureau. The House of Delegates should be thanked for agreeing to the concept of this new type of research and for budgeting the needed funds for it. Dr. Gerald W. Shaw, chairman, and Murray Klutch, director of the Bureau of Research and Planning, are to be thanked for their effective efforts in bringing the bureau to its present position of importance in the California Medical Association. The members of the association, along with all physicians, stand to gain immensely from this work and its products. In the ultimate, the patients of all physicians will be the recipients of the practical, applicable findings of the Bureau of Research and Planning.

The President's Page



Who Sets the Standards?

"Here is the beginning of progress: A recognition of the problems between men; a search for their cause; a condemnation of mere opinion."

—EPICTETUS

TO WHOM SHOULD America look for guidance in purchasing its health care? Several groups stand eager and prepared to do it. For one, labor is well tooled in this regard, and for obvious reasons. Business, often paying the costs, is acutely anxious. The insurance industry, wanting to sell a commodity, has ready answers—and government, responding to a "need" and with its paternalistic propensities, has moved in.

Each of these is energetic, has generous funds, many bureaus, health information units, "committees on human welfare," and "task forces" to do it. Each recognizes a major coming change in the purchasing habits of Americans when obtaining medical services and desires to become a dominant force in it.

But where is the medical profession? Where is the advice, opinion and leadership of the key group whose entire life is intimately tied to health care? It has been strangely mute, lagging, unsure! This should not be so, for criteria of excellence in many areas of medical activity have traditionally been established and enthusiastically applauded by the profession. Some standards have come easily and without befogging emotions, like drugs in the Pharmacopeia. Others required major soul-searching efforts—as the Flexnor Report and the crisis in medical education. Still others, this time involving standards of personal professional ability (as the colleges, boards and academies) have evolved gradually with the years.

Why is it then that medicine has lagged so far behind in setting standards by which the public can judge its purchase of health care? It might be that some observers blindly believe that private insurance is the devil's device for getting the government to take over medicine. Maybe a few physicians believe that prepayment against illness is soft, too uniform, and not in the American tradition of rugged individualism. It certainly can't be that a few physicians hope that health insurance will "go away" if it is ignored—because it won't. At least it won't go away from America—it will just go from physicians' control and guidance.

With vision, our House of Delegates, this year, instructed the C.M.A. to develop standards for Evaluating Comprehensive Health Insurance Programs. This is long overdue. True, some physicians will flinch at the word "comprehensive" because it sounds restrictive, and a few will cry that this is another step toward compulsion (they sound alike!). A very small voice may oppose all thoughts of such evaluation, even voluntary, and call it all a wicked disguise for a fee schedule—even though nothing could be further from the truth.

Nonetheless, in their traditional position of health leadership, the vast majority of physicians will applaud criteria established by us to guide our patients in selecting and evaluating excellent health insurance. A guide for ascertaining adequacy of coverage, appropriate exemptions, degrees of coinsurance, value of health maintenance, proper privileges of conversion, factors of age, etc., is essential. Again your medical society is assuming its privileged responsibility of setting the standard for quality in yet another important aspect of medical care.

Hamer D. Bates M.D.

California MEDICAL ASSOCIATION

NOTICES & REPORTS

Council Meeting Minutes

Tentative Draft: Minutes of the 472nd Meeting of the Council, Los Angeles, Biltmore Hotel, August 19, 1961.

The meeting was called to order by Chairman Sherman in Conference Room No. 2 of the Biltmore Hotel, Los Angeles, on Saturday, August 19, 1961, at 10:00 a.m.

Roll Call:

Present were President Bostick, President-Elect Wheeler, Speaker Doyle, Vice-Speaker Heron, Secretary Hosmer, Editor Wilbur and Councilors MacLaggan, Wilson, Todd, Quinn, O'Neill, Kirchner, O'Connor, Ham, Rogers, Dalton, Davis, Miller, Sherman, Campbell, Morrison, Kaiser, and Anderson. Absent for cause, Councilors Murray and Teall.

A quorum present and acting.

Present by invitation were Messrs. Hunton, Clancy, Collins, Marvin, Klutch and Tobitt, Mrs. Griffith and Doctors Batchelder and Miller of C.M.A. staff; Mr. Howard Hassard, legal counsel; county executives Scheuber of Alameda-Contra Costa, Geisert of Kern, Field, Dalbec and Baker of Los Angeles, Bannister of Orange, Dochterman of Sacramento, Donmyer of San Bernardino, Nute of San Diego, Thompson of San Joaquin, Rideout of Butte-Glenn and Grove of Monterey; Dr. Malcolm Merrill, State Director of Public Health; Dr. Lester McDonald and Mrs. Eunice Evans of the State Department of Social Welfare; Dr. Daniel Lieberman of the State Department of Mental Hygiene; Gean Haffey of the Joint Commission on Accreditation of Nursing Homes and Allied Facilities; Messrs. Richard Lyon and Webb Burke of California Physicians' Service; Doctors Albert C. Daniels, Allan Voigt, Douglas Donath, John M. Rumsey and others.

1. *Minutes for Approval:*

On motion duly made and seconded, minutes of the 471st meeting of the Council, held July 15, 1961, were approved.

2. *Membership:*

(a) A report of membership as of August 16, 1961, was presented and ordered filed.

(b) On motion duly made and seconded, 46 delinquent members whose dues had been paid were voted reinstatement.

(c) On motion duly made and seconded in each instance, ten applicants were voted Associate Membership. They were: Robert Cheever Doolittle, Alameda-Contra Costa County; William E. Hayes, San Diego County; Thomas Feichtmeir, Marcia Levin, Lillian Wong, San Francisco County; Roy Cohn, George J. Magid, Thomas S. Nelsen, Harvey Pirofsky, Mary E. Thompson Williams, Santa Clara County.

(d) On motion duly made and seconded in each instance, four members were voted Retired Membership. These were: Harold Smithies, Arthur Teeter, Alameda-Contra Costa County; Elmer Peterson, San Diego County; Margaret Carlsmith, San Francisco County.

(e) On motion duly made and seconded, five members were voted a reduction of dues because of illness or postgraduate study.

3. *State Department of Public Health:*

Dr. Malcolm Merrill, State Director of Public Health, presented a statement announcing the ap-

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proval for production and distribution of a live virus oral poliomyelitis vaccine. The statement stressed the fact that this vaccine is effective against one poliomyelitis strain only and is not to be used as a substitute for the Salk vaccine now in use.

Dr. Merrill also stated that a new state law which requires poliomyelitis vaccinations for all school children probably could not be put into effect with the new school year because of legal interpretations to be forthcoming from the State Attorney General.

4. *State Department of Social Welfare:*

Mrs. Eunice Evans, deputy director of the State Department of Social Welfare, gave a progress report on the medical care programs administered by the department and introduced Dr. Lester McDonald, newly appointed medical director of the department.

5. *State Department of Mental Hygiene:*

Dr. Daniel Lieberman, deputy director of the State Department of Mental Hygiene, reiterated the philosophy previously announced to the Council by Dr. Daniel O. Blain, director of the department, to the effect that the department cannot and should not attempt to take care of all mental illness in the state but should direct its attention to stimulating the use of other facilities, in the home and in private institutions. Statistics, he said, are proving the efficacy of this program, which eliminates the construction of additional state facilities.

6. *California Physicians' Service:*

Councilor Morrison, Chairman of the Board of Trustees of California Physicians' Service, reported that experience to date under the medical care program for federal employees indicates that a broader coverage will be possible for this group when the initial contract is to be renewed. The service-type program offered by C.P.S. is also gaining members, he reported, under the provisions of the law which allow employees to transfer from one type of plan to another.

This experience also indicates, he said, that an attractive offer can be made to state employees when their health care program, financed in part by the state, goes into effect.

7. *Commission on Medical Services:*

(a) Dr. John M. Rumsey reported that the Medicare authorities have proposed nonpublication of the schedule of fees for Medicare services. Under this proposal, physicians would bill for their usual and customary fees for the services provided; if such billing is within the maximum Medicare allowances, payment would be made; if the billing is beyond the maximum, Medicare would reduce the fee allowed. Every effort will be made to convince Medicare authorities that the fee schedule should continue to be published.

(b) Dr. Rumsey also reported that the Veterans' Administration, which for approximately 15 years has used California Physicians' Service as a fiscal agency and administrative intermediary in providing home-town medical care for service-connected disabilities of veterans, has ruled definitely to discontinue this arrangement. When the Council refused to approve direct dealings between the VA and individual physicians, with the C.M.A. serving only to submit names of eligible participating physicians, the VA consented to issue an agreement under which C.P.S. will supply the names of eligible physicians and will review cases where there is a fee dispute. The VA has stated that it cannot meet any expenses of C.P.S. for these services but will discuss such expenses with the C.M.A. at the end of the first fiscal year of operation.

After discussion, it was regularly moved, seconded and voted to accept the recommendation of the Commission on Medical Services that the program above, acceptable to VA, be approved and referred to C.P.S. for activation.

On motion duly made and seconded, it was voted that the C.M.A. reimburse C.P.S. for the nominal costs estimated, subject to discussion of such expenses with the VA at the close of the fiscal year, June 30, 1962.

8. *Public Relations:*

Dr. Douglas Donath reported that the Committee on Public Relations had voted to institute a series of regional public relations meetings, with attendants from neighboring county societies. He requested an appropriation of $8,000 to cover the cost of such meetings. The program is intended to stimulate effective public relations activities by county societies in homogeneous areas. After discussion, on motion duly made and seconded, it was voted (a) to approve the holding of public relations regional conferences on a pilot basis; (b) to refer to the Finance Committee for report the question of whether additional allocation of funds for such pilot conferences is necessary; and (c) to request the chairman of the Finance Committee, chairman of the Council and chairman of the Public Relations Committee to keep the program under review and to report back recommendations relating to the continuance of regional conferences after experience on a pilot basis.

9. *Committee on Scientific Work:*

Dr. Albert C. Daniels, chairman of the Committee on Scientific Work, presented a series of recommendations of the committee for application in the 1962 Annual Session. On motion duly made and sec-

onded, it was voted to approve the recommendations which would (1) discontinue postgraduate courses at Annual Sessions, (2) provide a series of live color television programs, (3) continue motion picture programs, and (4) plan three general meetings on a coordinated program basis and a fourth general meeting devoted to current developments in the basic sciences; for this meeting the travel expenses of guest speakers from California medical schools would be reimbursed.

A proposal for a general session open to the public was deferred for consideration until a report of the special ad hoc committee on scientific activities is received. This subject will be reviewed by this ad hoc committee and recommendations made to the Council at a later date.

Approval was voted for a meeting of the Committee on Scientific Work during or immediately following the 1962 Annual Session. No other regular committee or commission meetings are to be scheduled during the annual session.

10. *Committee on Committees:*

Dr. Wheeler reported as chairman of the Committee on Committees and recommended that Dr. Eugene Webb of San Francisco be appointed a member of the Bureau of Research and Planning to succeed Dr. Werner Hoyt, resigned, and that Anthony J. Sambuck of Santa Cruz be appointed a member of the Committee on Rural Health succeeding the late Dr. Alson Cary. On motion duly made and seconded, these recommendations were approved.

Relative to Resolution No. 84 of the 1961 House of Delegates, relating to a study of problems in county hospitals, the committee recommended that this matter be referred for study to the Committee on Government Financed Medical Care of the Commission on Medical Services. This was approved. Matters of disciplinary measures, quality of medical care, etc., were recommended to be referred to the Bureau of Research and Planning for quality of care aspects and the Judicial Commission for disciplinary aspects; the chairmen of these two, together with the president of the Board of Medical Examiners and the members of the Committee for Emergency Action, would then make recommendations. On motion duly made and seconded, this recommendation was approved.

11. *Report of President-Elect:*

Dr. Wheeler reported on his recent visits to several areas where migratory farm workers pose a health problem and commended most highly the district councilors and other physicians in these areas for their interest and cooperation.

12. *Finance Committee:*

Councilor Davis, reporting for the Finance Committee, reported that matters pertaining to Physicians' Benevolence Fund and the Trustees of the California Medical Association had been reviewed by the committee and action taken by the boards of these corporations. He also reported that the committee had approved a budget item of $7,500 for the Speakers' Bureau, in the knowledge that this represented deficit financing and in the hope that economies in other budget items would provide the needed funds. On motion duly made and seconded, this recommendation was approved.

13. *Speakers' Bureau:*

Councilor Anderson gave a progress report on the Speakers' Bureau and reported that considerable interest had been shown in the plans of the bureau. He also reported that three kits of material for local presentation had been supplied to county medical societies.

14. *C.M.A.-C.P.S. Liaison Committee:*

Dr. Anderson reported that the C.M.A.-C.P.S. Liaison Committee had met to consider several resolutions of the 1961 House of Delegates. Programs for nursing care in the home and for psychiatric care are already under way through C.P.S., he stated.

Dr. Anderson also reported that the subject of local county medical society advisory committees to California Physicians' Service is to be studied by a subcommittee of the C.M.A.-C.P.S. Liaison Committee; this subcommittee to be appointed by Dr. Lum.

Dr. Anderson also reported that the number of participants under the MD-65 program was decreasing and these contracts are not being renewed. Dr. Morrison reported that other plans for the aged, known as "Personal Protection Plans" are being developed in two forms, each of which provides specified coverages on a broader basis, based on C.P.S.'s schedules B, C and D. This permits a choice of six programs by the subscriber, at rates on form No. 1 at $14.25 to $16.00 per month per person and on form No. 2 at rates between $16.45 and $19.10 per month per person. On motion duly made and seconded, the development of these plans was approved.

15. *Bureau of Research and Planning:*

Dr. Gerald W. Shaw, chairman of the Bureau of Research and Planning, presented an outline of the elements to be included under a comprehensive health care program. On motion duly made and seconded, it was voted to approve the outline as submitted, without reference to income ceilings, and refer it to the Commission on Medical Services for further consideration.

16. *Committee on Other Professions:*

Mr. Hassard reported on progress made by the committee and the representatives of the California Osteopathic Association on the integration program. The Council approved report of Committee on Other Professions and, in so doing, it approved the following statement:

In response to many inquiries, and consistent with the current status of the unification agreement between C.M.A. and C.O.A., the California Medical Association Council, on August 19, 1961, approved the following permissive recommendations relative to the relationship of individual members of the medical and osteopathic professions during the current period of implementation of the unification agreement:

1. (a) It is appropriate for individual M.D.s and D.O.s to get to know each other better and to assist in the implementation of the unification agreement. Such assistance should be on a voluntary basis at the local level.

(b) The concept is supported that component societies, where appropriate, invite C.O.A. members to use special services of the society such as medical library and other similar specific services available to society members.

(c) The concept is supported that at the local level members of C.O.A., where appropriate, be invited to attend scientific meetings, postgraduate courses and other local educational opportunities.

2. (a) With respect to consultation, the recent action of the A.M.A. House of Delegates states that at state level determination of individual relationships should be predicated on whether an individual D.O. supports and practices medicine and surgery on a scientific basis. The C.M.A. believes that all members of C.O.A. who have made written application for the M.D. degree have signified an intent to practice scientific medicine and surgery. Hence, such D.O.s should be considered as fully complying with the standards adopted by the A.M.A.

(b) With respect to hospital staff appointments, the policy should be as follows: The matter of staff membership is a decision for the staffs of individual hospitals, but that there is nothing to prevent the C.M.A. and its county societies accepting the concept that hospital staffs may be integrated if the integration follows the organizational structure specified by the Joint Commission on Accreditation of Hospitals.

17. *Liaison Committee to Social Welfare:*

Councilor Quinn reported on several 1961 House of Delegates resolutions. No. 39, he reported, is already law. (Implementation of the Kerr-Mills Bill.) On No. 69, the committee is prepared to see pilot programs initiated, with the consent of the county societies.

Dr. Quinn also reported that a physician who allegedly overprescribed for PAMC patients is now before a county grand jury on possible fraud charges. He recommended that physicians guilty of such practices be dropped from PAMC participation or otherwise disciplined. On motion duly made and seconded, his report was approved with the recommendation that the State Social Welfare Board adopt regulations to control vendors who, after reasonable hearing, are shown to be abusing the PAMC program.

Mr. Webb Burke of C.P.S. reported on exploratory discussions held on a proposed prepayment program for OAS beneficiaries.

18. *Commission on Community Health Services:*

Dr. MacLaggan reported that health information column previously discussed was in preparation and that numerous suggestions had been received. All questions and answers in this series, which will be presented to newspapers desiring to use it, are being checked for professional accuracy. He suggested that several activities within the commission be closely coordinated with the Committee on Public Relations. On motion duly made and seconded, it was voted to refer the health information column and other activities to the chairman of the Committee on Public Relations.

19. *Legal Department:*

Mr. Hassard reported on a recent Superior Court decision in a case filed by a group of chiropractors who sought to expand the scope of their practice to permit the practice of obstetrics, minor surgery and the prescribing of drugs. The court held that the practice of chiropractic was limited to that practice as taught in chiropractic schools in 1922, when the chiropractic initiative was adopted by vote of the people. This decision, if it stands, will limit the scope of chiropractic education so severely that prospective students may see fit to go into physical therapy or other recognized forms of paramedical procedures.

20. *Chartered Air Trips:*

On motion duly made and seconded, it was voted to approve the proposal of a specified travel agency to provide chartered international air tours, provided adequate staff supervision were provided by C.M.A. staff.

Adjournment:

There being no further business to come before it, the meeting was adjourned at 5:00 p.m.

SAMUEL R. SHERMAN, M.D., *Chairman*
MATTHEW N. HOSMER, M.D., *Secretary*

ANNUAL MEETING

Fairmont Hotel
SAN FRANCISCO

April 15-18, 1962

Papers for Presentation

(LAST CALL)

If you have a paper that you would like to have considered for presentation, it should be submitted *to the appropriate section secretary* (see list on this page) no later than November 1, 1961.

Scientific Exhibits

(LAST CALL)

Space is available for scientific exhibits. If you would like to present an exhibit, please write immediately to the office of the California Medical Association, 693 Sutter Street, San Francisco 2, for application forms. To be given consideration by the Committee on Scientific Work, the forms, completely filled out, must be in the office of the California Medical Association no later than **November 15, 1961.** (No exhibit shown in 1961, and no individual who had an exhibit at the 1961 session, will be eligible until 1963.)

Medical Motion Pictures

The Film Symposiums which attracted excellent attendance in 1961 will be continued in 1962.

Authors desiring to show films should send their applications to Paul D. Foster, M.D., chairman, Motion Picture Division, C.M.A., 693 Sutter Street, San Francisco 2. All authors are urged to be present at the time of showing as there will be time allotted for discussion and questions from the audience after each film.

Deadline: December 1, 1961.

PLANNING MAKES PERFECT
AN EARLY START HELPS

SECRETARIES OF SCIENTIFIC SECTIONS

ALLERGY . . . . . **Jerome J. Sievers**
4835 Van Nuys Boulevard, Sherman Oaks

ANESTHESIOLOGY . . . . . **Grant Fletcher**
P. O. Box 569, Monterey

DERMATOLOGY AND SYPHILOLOGY . . **David R. Taylor**
1237 R Street, Fresno 21

EAR, NOSE AND THROAT . . . . **Henry L. Harris**
3875 Wilshire Boulevard, Los Angeles 5

EYE . . . . . **Richard A. Westsmith**
12 North El Camino Real, San Mateo

GENERAL PRACTICE . . . . **A. Norton Donaldson**
321 West Washington Avenue, Santa Ana

GENERAL SURGERY . . . . . **R. Bruce Henley**
400 Twenty-Ninth Street, Oakland 9

INDUSTRIAL MEDICINE AND SURGERY . **Peter L. Hoffman**
3533 West Pico Boulevard, Los Angeles 19

INTERNAL MEDICINE . . . . . **Glenn A. Pope**
2600 Capitol Avenue, Sacramento 16

OBSTETRICS AND GYNECOLOGY . **Kenneth F. Morgan, Jr.**
2010 Wilshire Boulevard, Los Angeles 57

ORTHOPEDICS . . . . . **Albert H. Rodi**
2010 Wilshire Boulevard, Los Angeles 57

PATHOLOGY AND BACTERIOLOGY . **Carl M. McCandless, Jr.**
St. Joseph's Hospital, Buena Vista and Park Hill, San Francisco 17

PEDIATRICS . . . . . **R. Bruce Jessup**
2151 Berkeley Way, Berkeley 4

PHYSICAL MEDICINE . . . . . **Karl H. Haase**
Wadsworth General Hospital, V. A. Center, Los Angeles 25

PREVENTIVE MEDICINE AND PUBLIC HEALTH . . . . . **Irving D. Litwack**
2655 Pine Avenue, Long Beach 6

PSYCHIATRY AND NEUROLOGY . . . **Mark Zeifert, Henry S. Colony**
Psychiatry: Mark Zeifert, 1065 S Street, Fresno 21
Neurology: Henry S. Colony, 411 Thirtieth Street, Oakland 9

RADIOLOGY . . . . . **Robert L. Scanlan**
2131 West Third Street, Los Angeles 57

UROLOGY . . . . . **August Spitalny**
3637 California Street, San Francisco 18

In Memoriam

ALLEN, ROY EARL, Reedley. Died July 20, 1961, in Reedley, aged 78. Graduate of Ensworth Medical College, St. Joseph, Missouri, 1904. Licensed in California in 1926. Doctor Allen was a member of the Fresno County Medical Society.

✤

BENNETT, EDWIN S., Morro Bay. Died August 22, 1961, at Morro Bay, aged 73. Graduate of New York University College of Medicine, New York, 1914. Licensed in California in 1920. Doctor Bennett was a retired member of the Los Angeles County Medical Association and the California Medical Association, and an associate member of the American Medical Association.

✤

BOREN, RALPH CLINTEN, San Diego. Died August 23, 1961, in San Diego, aged 57. Graduate of the University of Illinois College of Medicine, Chicago, 1930. Licensed in California in 1932. Doctor Boren was a member of the San Diego County Medical Society.

✤

BROWN, WALTER BIGELOW, Livermore. Died April 14, 1961, aged 61, of chronic hepatitis. Graduate of Rush Medical College, Chicago, Illinois, 1930. Licensed in California in 1931. Doctor Brown was an associate member of the Alameda-Contra Costa Medical Association.

✤

BURSELL, ARVID, Enterprise. Died July 27, 1961, in Enterprise, aged 83, of heart disease. Graduate of the University of Oregon Medical School, Portland, 1908. Licensed in California in 1923. Doctor Bursell was a member of the Shasta-Trinity County Medical Society.

✤

CHILTON, FRANK NIFONG, Campbell. Died August 12, 1961, in San Jose, aged 75. Graduate of Washington University School of Medicine, St. Louis, Missouri, 1909. Licensed in California in 1923. Doctor Chilton was a retired member of the Santa Clara County Medical Society and the California Medical Association, and an associate member of the American Medical Association.

✤

CORNEILLE, JAMES G., Mt. Vernon, New York. Died November 14, 1960, aged 73. Graduate of the New York University College of Medicine, New York, 1914. Licensed in California in 1924. Doctor Corneille was a member of the Alameda-Contra Costa Medical Association.

✤

CUMMINGS, JOHN ELWIN, Los Angeles. Died August 2, 1961, in Houston, Texas, aged 59. Graduate of the College of Medical Evangelists, Loma Linda-Los Angeles, 1929. Licensed in California in 1929. Doctor Cummings was a member of the Los Angeles County Medical Association.

✤

FATH, ALICE, Fresno. Died August 16, 1961, aged 62. Graduate of Johann Wolfgang Goethe-Universitat Medizinische Fakultat, Frankfurt-am-Main, Prussia, Germany, 1927. Licensed in California in 1935. Doctor Fath was a member of the Fresno County Medical Society.

HOILIEN, MAURICE JAMES, Eureka. Died August 14, 1961, in Palo Alto, aged 57. Graduate of Rush Medical College, Chicago, Illinois, 1931. Licensed in California in 1931. Doctor Hoilien was a member of the Humboldt-Del Norte County Medical Society.

✤

JONES, GEORGE WILSON, Los Angeles. Died August 21, 1961, in North Hollywood, aged 64. Graduate of Rush Medical College, Chicago, Illinois, 1922. Licensed in California in 1922. Doctor Jones was a member of the Los Angeles County Medical Association.

✤

LEVEN, AARON SAMUEL, Los Angeles. Died August 22, 1961, in Beverly Hills, aged 64, of myocardial infarction. Graduate of Kansas City College of Medicine and Surgery, Missouri, 1919. Licensed in California in 1945. Doctor Leven was a member of the Los Angeles County Medical Association.

✤

MICHAEL, RALPH H., JR., North Hollywood. Died August 8, 1961, in North Hollywood, aged 44. Graduate of George Washington University of Medicine, Washington, D. C., 1943. Licensed in California in 1943. Doctor Michael was a member of the Los Angeles County Medical Association.

✤

ORCUTT, ARTHUR HENRY, Oakland. Died August 8, 1961, aged 69, of carcinoma metastatic to liver from prostate. Graduate of the University of Illinois College of Medicine, 1918. Licensed in California in 1923. Doctor Orcutt was a member of the Alameda-Contra Costa Medical Association.

✤

PINNEY, IONE, Los Altos. Died August 7, 1961, in Los Altos, aged 96. Graduate of Bennett Medical College, Chicago, Illinois, 1910. Licensed in California in 1928. Doctor Pinney was a retired member of the San Joaquin County Medical Society and the California Medical Association, and an associate member of the American Medical Association.

✤

STEIN, HAROLD LAWSON, Inglewood. Died August 7, 1961, in West Los Angeles, aged 37. Graduate of George Washington University School of Medicine, Washington, D. C., 1950. Licensed in California in 1956. Doctor Stein was a member of the Los Angeles County Medical Association.

✤

STELHORN, ALBERT FREDERICK, Rosemead. Died August 10, 1961, in San Marino, aged 57, of heart disease. Graduate of the College of Medical Evangelists, Loma Linda-Los Angeles, 1930. Licensed in California in 1930. Doctor Stelhorn was a member of the Los Angeles County Medical Association.

✤

TRETHEWAY, LESTER EMMET, Aptos. Died August 14, 1961, in Palo Alto, aged 72. Graduate of Hahnemann Medical College of the Pacific, San Francisco, 1916. Licensed in California in 1916. Doctor Tretheway was a member of the Santa Cruz County Medical Society.

No. 1*

Occupational Medicine Today

PERHAPS the earliest of the several functions identified with occupational medicine is the emergency treatment of industrial injuries. It once accounted for most of the effort in the field of occupational medicine. Today, this has changed. The emergency treatment of industrial injured has descended to a position of lesser importance.

Occupational injuries now account for a very small portion of the total cost of illness to industry: Costs of accidental injuries and occupational diseases are less than one-third the sick leave costs of nonoccupational illness and injury. The workman who is injured in a large plant expects, and rightly so, to receive the finest emergency medical care as soon as possible, and he looks to the company for this benefit.

As the field of occupational health becomes more complex, it has logically followed that the field of environmental hygiene is becoming increasingly important to the physician in occupational medicine. New processes involving new chemicals are being developed every day to produce new and better products for the public.

The elimination and control of occupational hazards due to various gases, solvents and dusts or to ionizing radiation, is a responsibility of the physician in occupational medicine, working with other departments concerned in a company. There are special problems connected with the diagnosis and treatment of these exposures which require knowledge of the chemical make-up and toxocologic features of the substances involved.

A physician practicing occupational medicine knows the processes and chemicals involved and is in a position to recognize the special kinds of occupational exposure with which an employee comes into contact and to diagnose and treat the ills that may result.

Due to the complexities of modern industrial processes, a private practitioner may unwittingly become a party to an unwarranted claim of occupational disease or injury. The diagnosis of occupational disease should be based on scientific method, not hearsay, and in these cases private physicians should consult with physicians who specialize in occupational medicine.

Counseling on emotional problems, both occupational and nonoccupational, is not always feasible in a busy private office, and many of such problems first come to light in the industrial medical department. They do not necessarily call for a trained psychiatrist, but rather for a physician who has been taught something of psychological and emotional reactions, who knows the temperament of the individual, is familiar with the occupational situation and has time to talk to the patient.

The art of medicine practiced by the country physician consisted mainly in good two-way communications between the doctor and the patient. In a busy private office these communications may be difficult. Many physicians in occupational medicine are helping to hold this gateway of communications open.

COMMITTEE ON OCCUPATIONAL HEALTH
CALIFORNIA MEDICAL ASSOCIATION

*This is the first of a series of articles prepared by the Committee on Occupational Health.

NEXT MONTH | RELATIONSHIP OF OCCUPATIONAL MEDICINE TO PRIVATE PRACTICE

Maternal MORTALITY REPORTS

These case reports are taken from the files of the State Department of Public Health which, together with the California Medical Association, now sponsors the statewide studies of all maternal mortalities. Selected cases are here presented from time to time as a matter of interest and illumination to all physicians concerned with the practice of obstetrics. They are prepared by the Committee on Maternal and Child Care. It is hoped that a review of such significant cases will help to improve the welfare of future California mothers.

CASE NO. 5

THIS PATIENT was a 33-year-old Mexican, gravida 4, para 1. Following two spontaneous abortions she carried a pregnancy to term two years before her death. She was delivered by cesarean section after a pregnancy said to be 44 weeks, and the infant weighed 12 pounds but was stillborn. Approximately six months later a diagnosis of diabetes mellitus was made and the patient was maintained on a moderate dosage of insulin.

During the current pregnancy the patient was seen from the third month of gestation onward, with weekly visits alternating between an obstetrician and an internist. Insulin dosage ranged between 80 and 100 units daily, type not specified. The patient cooperated poorly in her medical regimen, and control of the diabetes was reported as "difficult." "Excessive" weight gain occurred, but no other signs or symptoms of toxemia developed.

The patient was first admitted to the hospital at the 36th week of pregnancy for evaluation of the diabetes and for elective cesarean section and was observed for three days before operation. The only blood sugar determination, two days before operation, was 22 mg. per 100 cc., and at this time the CO_2 combining power was determined at 12.5 mEq. per liter. Urinalysis was negative for protein, sugar, or significant microscopic findings. The blood pressure was 100/60 mm. of mercury. Hemoglobin content was 9.4 gm. per 100 cc. of blood and the packed cell volume was 30 per cent. There is no record of any iron therapy or of preoperative transfusion.

A half hour before cesarean section, 25 mg. of promethazine (Phenergan®) and 0.4 mg. of scopolamine, were given. At this time also, 80 units of lente insulin was administered. Intravenous administration of glucose solution (5 per cent in water) was started just before induction of anesthesia.

Spinal anesthesia was then induced with 15 mg. of tetracaine (Pontocaine®) given with the patient in sitting position. She was then placed in Trendelenberg position. Almost immediately she became very pale, air-hunger developed and the pulse became "very rapid." At once her position was leveled and oxygen administration with bag breathing was attempted. By this time the blood pressure was unobtainable. Almost simultaneously the following measures were employed: (1) one ampule of Vasoxyl® (methoxamine hydrochloride) intravenously and one ampule intramuscularly; (2) 30 ml. of 50 per cent glucose intravenously; (3) one ampule of levarterenol bitartrate (Levophed®) added to the intravenous infusion; (4) endotracheal intubation with 20 mg. of diacetylcholine (Anectine®) used as a relaxant; (5) within the hour after initial shock, 40 mg. of metaraminol (Aramine®) and "more" Levophed® added to the infusion. Fetal heart tones disappeared soon after the initial development of shock.

One hour after induction of anesthesia, the blood pressure was again measurable at 90/50 mm. of mercury, and soon it rose to 135/100 mm. The pulse rate reached 120, and the patient became hyperactive. The endotracheal tube was then removed—one and one-half hours after initial anesthesia. Shortly thereafter signs of acute pulmonary edema developed, and the patient again went into shock. Endotracheal intubation was reinstituted and vasopressor agents were again given, as well as desacetyl-lantoside (Cedilanid®), hydrocortisone (Solu-cortef®), meralluride (Mercuhydrin®) and chlorothiazide (Diuril®). From the onset of anesthesia, a total of 2,600 ml. of intravenous fluids had been given, but blood transfusion is not mentioned. Despite these measures, the patient did not recover from shock and died two hours and 20 minutes after induction of spinal anesthesia. An electrocardiogram obtained just before death suggested a high blood potassium level. There were no convulsions at any time. At autopsy the following significant observations were made: (1) diabetes mellitus, severe (sugar content of postmortem blood, 1,520 mg. per 100 cc.); (2) evidence of shock and cardiovascular failure; (3) acute pulmonary edema, minimal; (4) hyperpotassemia—10.5 mg. per 100 cc. in clear, nonhemolyzed postmortem serum.

COMMENT

This case presents a considerable array of items calling for comment.

1. This patient's first term pregnancy produced a 12-pound infant, stillborn. Even though the duration of that pregnancy was said to have been 44 weeks, this should not have lulled the suspicions of the attending physician regarding the possibility of maternal diabetes, for postmaturity alone cannot bring about excessive fetal size. It is generally agreed that the delivery of a first or second child weighing more than 10 pounds warrants reasonably prompt maternal investigation for diabetes. Unexplained stillbirth makes the indication more imperative.

2. This pregnant diabetic patient was first admitted to the hospital at the 36th week of pregnancy. With certainty of good control of the diabetes, outpatient management of such patients is acceptable. When, however, there is the slightest difficulty in maintaining good control, or if the patient is a juvenile or "fragile" diabetic, it is highly advisable to admit the patient to the hospital for study *early* in pregnancy in order to establish a diabetic regimen in meticulous detail—and maintenance of control may indeed require several admissions during the course of pregnancy.

From this point of view, care was considerably less than ideal for this patient, for at the time of her admission she was hypoglycemic and acidotic. Moreover, despite these worrisome laboratory findings, only a single determination of blood sugar and of CO_2 combining power was done. Obviously, the in-hospital study was grossly inadequate to obtain even adequate diabetic control, as was the short preoperative period of only three days—especially for a patient slated for a major surgical procedure.

3. Not only was preoperative preparation from the diabetic point of view poor, but operative risk was compounded when no attempt was made to correct the anemia before operation. Certainly no patient should undergo an elective cesarean section with a hemoglobin level of only 9.4 gm. per 100 cc. and packed cell volume of 30 per cent. Transfusion is urgently indicated in such circumstances.

4. Next, one might mildly question the propriety of using promethazine before operation in a patient with a blood pressure of only 100/60 mm. of mercury and due to have a spinal anesthetic. Even a mild hypotensive effect from it could well start a disastrous chain of events.

5. The advisability of giving the patient's full daily insulin dosage just before operation is questionable. We have no knowledge of the glycosuria status of the patient in the present case, but in general it is good practice to have the patient "spilling" some sugar at the time of operation. If a full dosage of insulin is then given, large amounts of intravenous glucose solution must be administered. This patient did receive her full dosage just before operation, and 5 per cent dextrose solution was started intravenously, but not until the advent of shock was extra glucose given. It is probable that hypoglycemia and acidosis contributed materially to the degree and persistence of shock. Both tend to produce vasodilatation, which would reinforce the other shock-producing factors in this patient (see below). And it may well be that these vascular influences were added critical factors in the production of a vascular collapse which responded so poorly to vasopressor agents and terminated in irreversible shock.

6. The principal responsibility for the shock, however, must be assigned to the spinal anesthesia. This patient received 15 mg. of Pontocaine®, roughly equivalent to 150 mg. of procaine. This is a maximal dose of spinal anesthesia even for abdominal operation in a non-pregnant patient (range for such patients: 6 to 16 mg. of Pontocaine®). And the higher the dosage, the greater is the likelihood of "spinal shock." According to Dr. N. E. Assali, who has studied extensively the relationships of the hemodynamics of pregnancy to spinal anesthesia, two additional factors are operative in pregnancy which make "spinal shock" more likely than in a comparable non-pregnant patient:

(1) There is increased neurogenic tone—that is, maintenance of blood pressure is almost completely under autonomic control, with humoral mechanisms at a minimum. Thus, the blood pressure is more sensitive to autonomic blockade by spinal anesthesia. (It is important to remember that the reverse is true in a *toxemic* pregnant patient, the principal control of blood pressure then being by humoral mechanisms.)

(2) In a pregnant patient, there is pooling of blood in the lower extremities as a result of any lowering of blood pressure by spinal anesthesia. This greatly decreases cardiac output and is the principal factor in the production of spinal anesthesia shock in the non-toxemic pregnant patient. (When toxemia of pregnancy is present this mechanism is inoperative, "spinal shock" rarely occurring.)

From his knowledge of these mechanisms, Dr. Assali makes the flat-footed statement that "*normal pregnant patients (and patients with essential hypertension) should be given a third the amount of spinal anesthetic administered to non-pregnant individuals.*" On this basis, a maximal dose of Pontocaine® would be in the range of 5 mg. Anesthe-

tists generally feel safe in employing 7 to 10 mg., but the latter dose is certainly the upper limit. It is significant to note that the anesthetist with extensive experience of spinal anesthesia in obstetrics tends to use smaller doses than does the debutant in this field.

In this patient, then, over-dosage of spinal anesthetic initiated the tragic terminal chain of events. When shock occurred, the single most important corrective measure was omitted—namely, raising the legs 90 degrees. Even simple Trendelenberg position is of some value, but not sufficient to restore the cardiac output. In the present case the patient was actually "leveled," and there is no mention of any leg-raising maneuver. Dependence was placed instead on vasopressor agents, and they were not adequate to the task of restoring effective circulation of blood volume promptly enough to prevent irreversible damage from the spinal shock.

Elective cesarean section should be, today, an extremely safe operation. But, as this case illustrates, the opportunities for lethal errors of commission and omission are manifold, and are only avoided by thorough familiarity with modern knowledge and meticulous attention to its complete application.

Tissue Committee of a Hospital Medical Staff

A Report of the Medical Review And Advisory Board

SERVICE TO HUMANITY is the principal objective of the medical profession. Physicians, faithful to the honored traditions of the profession, recognize that they are trustees of medical knowledge and skills. The Code of Medical Ethics obliges all members of the profession to "strive continually to improve medical knowledge and skill, and . . . make available to their patients and colleagues the benefits of their professional attainments."

American physicians have developed, as an integral part of the practice of medicine, the concept that physicians admitted to privileges in the hospital, should organize themselves into a self-governing medical staff. Good hospital administration today and the law in many states which regulates hospital organization, have uniformly adopted this principle.

The ethical and legal concepts concerning continuing education and self-government of the hospital medical staff, have fostered the organization of medical staff review committees. Through the work of these committees, the public and professional responsibility of the whole staff, as well as that of each staff member, is promoted by a review and comparison of the medical work of each member of the staff. The right of medical groups, in good faith, to define and demand certain requirements of its members, has been upheld by the courts when these requirements have a reasonable connection with improving and maintaining the standards under which members practice their profession, and tend to regulate fair dealing among the members of the profession and with the public.

There is one medical staff review committee, or several, concerned with all or different facets of medical care rendered in a hospital. Frequently, the size of the hospital and the number of records to be reviewed determines the number of review committees needed. This paper will describe the tissue committee, its organization, purpose and function when it is separately established. However, some medical staffs will have one committee perform this and other functions. The general procedures outlined here would be applicable in both instances, with appropriate revisions and modifications.

The Model Medical Staff By-Laws recommended by the Joint Commission on Accreditation of Hospitals, suggests the formation of a tissue committee in the following language:

"The Tissue Committee shall include representatives of the departments of surgery, gynecology, obstetrics, and such other departments as desired—usually the Pathologist should sit as a member of this committee or ex officio. The duties of the Tissue Committee shall be to study and report to the staff, or to the Executive Committee of the staff, on the agreement or disagreement among the preoperative, postoperative and pathological diagnoses and on whether the surgical procedures undertaken in the hospital were justified or not. This study will also include those procedures in which no tissue was removed. The report to the Executive Committee shall be in writing on at least a monthly basis."

Approved by the Council of the California Medical Association, August, 1961.

Purpose of the Tissue Committee

The tissue committee's function is to further medical staff education and self-discipline. Its influence should be positive. By analysis and review of tissues removed, continuing education is afforded to elevate the caliber of medical care being provided in the hospital. The work of the tissue committee is not directly concerned with a particular patient's medical problem, or what should be done about it. It is, instead, a postsurgical activity, taking place usually quite some time after the patient has left the hospital, relating to the tissue removed. Study and comparison is made of the preoperative diagnosis with both the postoperative diagnosis and the pathologist's report. It charts and tabulates the facts and compares the results with its recent periodic reports and with recommendations of other hospitals, when available, in order that the practice of all can be improved by such knowledge.

Tissue Committee Method of Procedure

In general, there are at least three methods of operation this committee may use to review the surgical work of the staff or any part of it. First, the medical history itself may be reviewed. A second and rather simple and direct method is to make provision for one extra copy of the pathologist's report to be prepared and sent to the tissue committee, identified only by case number. When this system is used, the preoperative and postoperative diagnoses must be shown on the pathology report. The third method is to provide for a synopsis worksheet to be prepared by the records librarian which has posted to it such vital information as:

1. Patient's hospital number;
2. Patient's age;
3. Preoperative diagnosis;
4. Postoperative diagnosis;
5. Operative procedure;
6. Tissue removed, if any;
7. Tissue number;
8. Pathological diagnosis, if any; and
9. Operative and postoperative complications.

The following is a description of the worksheet method to illustrate how it operates. Each hospital tissue committee ought to devise its own system, best suited to itself. The plan that is illustrated is used by many and can serve as a guide. In the interest of brevity, alternate plans are not outlined.

The committee chairman or other designated members review each worksheet. Where there is consistency throughout, and where no operative or postoperative complications occurred, the results are merely tabulated for the purpose of interim and annual reports. In those instances of diagnostic and pathological inconsistency, or occurrences of complications, the case is assigned to a member of the committee for a more detailed examination. The extent of further evaluation will include at least a review of the patient's chart, and may include a personal interview with the attending physician. Not only must this evaluation attempt to resolve reasonably any disagreement among the preoperative, postoperative, and pathological diagnoses, but it should also attempt to determine whether the surgical procedure performed was adequately indicated, and whether the quality of the work is acceptable.

At the next committee meeting, each member reports his findings to the entire committee for appraisal. The results and recommendations are then tabulated as before. Cases presenting unresolved inconsistencies or potential deficiencies in desired standards of care, are referred to an appropriate administrative medical staff committee (herein called the executive committee) for further evaluation.

At the bottom of each worksheet are four numbered items, each corresponding to the extent of investigation necessary. They are checked and dated when completed.

	Check	Date	
1.	.....		Completed on worksheet.
2.	.....		Completed on additional evaluation
3.	.....		Referred to executive committee.
4.	.....		Completed by executive committee.

The tissue committee chairman checks and dates the appropriate disposition contained within the first three items. All worksheets, regardless of the type and disposition by the tissue committee, are referred to the office of the executive committee for sorting and final tabulation. Those cases "referred to the executive committee" are presented to the next regularly scheduled meeting of that committee for further evaluation and final disposition. As each worksheet is complete in its routing, an indication of its final disposition is entered on a central file card maintained for each staff member of the hospital. The items to be entered on this card consist of the patient's number, the number corresponding to the final disposition (Arabic numeral 1, 2, or 4), followed by the date of final disposition. Since these file cards are maintained only for purposes of identifying which cases have been reviewed, and in general, what percentage of such cases have required more than the information contained on the worksheet for evaluation, there need be no further comment. It should be remembered that a difference of medical opinion concerning a case need not indicate inadequate care.

CENTRAL FILE CARD

DOCTOR.....

Patient Number	Disposition	Date
3425	1	2/17/60
6789	2	2/26/60
7127	1	3/ 5/60
7536	2	3/14/60
7718	4	3/22/60
7931	1	4/ 4/60

If a particular case requires corrective action concerning the attending physician, a written memorandum by the executive committee should be maintained in the physician's credentials committee file. In the absence of corrective action, there is no reason to maintain any records in addition to the information ultimately contained on the central file card as noted above. If at any later date it appears that a particular doctor is accumulating an excessive quantity of cases requiring executive committee examination ("4" on his file card), the various patients' records or microfilms thereof, so identified, can be rereviewed in concert by the executive committee to determine the presence or absence of a specific pattern of needed corrections. Self-discipline through staff education is promoted.

The Statistical Report of the Tissue Committee

The format of the periodic and annual report of this committee can be quite variable, but for proper educational value it should contain both statistics and comments. An example is as follows:

"The Tissue Committee reviewed 100 operations performed in this hospital during the month of July. In ninety of these cases, there appeared to be no question about the surgical indication for the removal of the tissue taken. In eight of the remaining cases, after the clinical record of the patient was reviewed, the committee reached the same conclusion. Two cases were referred to the Executive Committee for further review.

"Fifty appendices were removed: Thirty-six were reported diseased; ten were removed incidental to

other abdominal surgery; three were reported as not acutely diseased, but were justifiably removed on clinicosurgical grounds.

"Of ten uteri, ovaries, and Fallopian tubes removed, eight were reported diseased. The two remaining cases revealed justification on clinical grounds.

"This record would indicate a considerable improvement over the degree of diagnostic judgment since July of last year. Where the clinical record was examined, it was found to be in good condition. Improvement could be made, especially in the timeliness and completeness of the record. In one instance, an intern entered a conclusion which was not supported by the facts, and it had not been corrected by the attending physician."

The Admissibility of Tissue Committee Records and Testimony of Committee Members in Malpractice Suits

The question has frequently been asked, "Can the tissue committee records or the members of a tissue committee be subpoenaed in a malpractice action against the attending physician?" Within the knowledge of the authors, there is no case to date in which these issues have been presented and decided by the courts.

It should be remembered that a subpoena may be issued for the production of a record or the appearance of a witness, but that the record or the testimony might never be admitted in evidence during the trial of the suit. It would seem that based on established principles, tissue committee records or testimony of the members of the committee acting as a tissue committee, would not be admissible in a malpractice action.

First, there is no physician-patient relationship existing between the members of the committee and the patient. The committee does not examine the patient, nor do they consult with the attending physician during the course of treatment.

Second, the records of the tissue committee do not become a part of the clinical record of the care rendered a patient. They are not required as part of the care, are not made contemporaneously with the treatment, and do not relate in any way to the treatment. These records are not original records concerning the care rendered to a patient. They relate, rather, to the process of self-education and self-betterment of the medical staff as a whole.

Third, the committee records generally are tabular and relate to trends. They can be said to be strictly confidential intraorganizational studies for the purpose of improving medical staff knowledge, self-education and self-discipline. Committee members' acts and decisions, made in good faith to promote professional standards, are given a qualified or limited privilege.

Fourth, the standard of judgment used in the work of the tissue committee is a standard of excellence. This standard is irrelevant to the issue of the prevailing standard of care or diagnostic judgment used by the ordinary physician in a community.

CONCLUSION

The multiplicity of modern research achievements and rapidly changing trends are placing an almost overwhelming burden on the average medical and surgical practitioner. Even the most conscientious finds it increasingly difficult in the face of an active and demanding practice to read profitably a sufficient number of the better medical journals. Postgraduate courses in various medical centers are designed to help the busy practitioner to keep abreast of recent developments, but they must necessarily be limited in subject matter and doctor exposure.

As a matter of fact, any program of continuing education, whether by articles, courses, seminars or the like, will be broadly effective only as far as the individual practitioner and his local group are apprised of and carry out the findings and recommendations of various developments.

To maintain and improve the quality of medical care, there is inestimable value in the continuous evaluation of current clinical practice and correlation of the findings with modern achievements and trends. The review of tissue and other medical activity can become an integral part of this educational program. A suggested plan for organization and operation of a committee to perform this review is discussed.

PUBLIC HEALTH REPORT

MALCOLM H. MERRILL, *M.D., M.P.H.*
Director, State Department of Public Health

CALIFORNIA is experiencing a new occupational disease in its mushroom-growing industry, similar to a disease which has been reported among mushroom farm workers in Pennsylvania and in Ontario, Canada.

Although California has been raising commercial mushrooms for more than 40 years, the new disease first appeared during the spring months of 1960, and developed again in increased severity this spring. Some 80 men, all of them employees of one large growing establishment, have been affected to date.

The disease, although severe, with fever and chills, cough, nosebleed and skin trouble, does not appear to endanger life nor permanently incapacitate. The cause is suspected to be a yet unidentified mold spore that has infected the mushroom beds and that affects the growers only when they break up the mushroom beds at the end of each growing cycle.

The Bureau of Occupational Health has spent considerable time and effort to determine the true nature of this new occupational problem, which as yet has not been fully described in the medical literature. Endeavors are being made to prevent spread of the disease to the more than 60 other growers in California.

* * *

Two informal public meetings on proposed regulations for carrying out the provisions of the compulsory school poliomyelitis vaccination law have been scheduled for Los Angeles on October 3 and in Berkeley, October 17.

A draft of the regulations was prepared following department discussion with representatives of the State Department of Education, California School Board Association, California Junior College Association, and superintendents of several school districts.

Purpose of the public meetings is to give all interested parties an opportunity to express their views on the proposed regulations, which will be considered for adoption at the December 8 meeting of the State Board of Public Health.

The proposed regulations already have been reviewed by the department's ad hoc Advisory Committee on the Prophylaxis of Poliomyelitis, and two committees of the California Conference of Local Health Officers.

The Surgeon General of the U. S. Public Health Service recently took note of the likelihood of an upswing of influenza during the coming winter. He said we probably are due for some Asian influenza outbreaks, since they come in two to three-year cycles, and we are overdue for Type B influenza outbreaks which come in four to six-year cycles. Asian influenza has been dormant since March, 1960, and it has been more than six years since there has been much of Type B in this country.

There was no evidence of influenza in California during the 1960-61 season. California did experience a widespread outbreak of a respiratory viral disease in February and March of this year, mainly in infants and children. This outbreak, however, was not caused by either A or B, and was not traced to any specific agent at the time.

Many physicians probably vividly recall the last severe, although short, influenza epidemic during the first three months of 1960 in California. That epidemic also was felt throughout the nation and led to a substantial increase in total morbidity and mortality. In California it was estimated that a total of 3,500 "excess deaths" occurred during that period. Of these, about 1,000 deaths were directly attributable to influenza and pneumonia while the remainder was in increase of deaths from other causes, notably cardiovascular and chronic pulmonary diseases.

Again this year the department will ask several local health departments to participate in the annual Influenza Surveillance Program, beginning November 1. The program serves as a rapid detection mechanism to pinpoint any unusual outbreaks of respiratory disease. One of its aims is to obtain specimens early for rapid identification of the prevailing organism and to assess if possible the extent of the outbreak.

The department again this year recommends that certain persons be vaccinated against influenza; in particular, persons at all ages with cardiovascular or pulmonary conditions, persons over the age of 65, and pregnant women. In years of expected high incidence, vaccination is recommended for key community groups, such as persons in medical and health services, public safety, public utilities, transportation, education and communications, and persons in age groups in which influenza occurs in highest incidence, namely, five to 25 years.

Health Careers

TODAY, as we enter a new decade, there are ever widening horizons before us. People everywhere have been taught that American medicine is the finest in the world. We are expected to be leaders in providing both preventive and corrective health care. Many in the health field careers contribute to that reputation, and find that they are engaging in professions of greater opportunity, challenge and rewarding satisfaction than ever before. In order to "preserve and enhance the heritage of American Medicine" our objective must be to encourage and guide the intelligent young students of today into one of the health careers where they can carry on our great traditions and contribute to solving the needs of tomorrow. These needs cannot be solved by increasing the number and size of training facilities or loan and scholarship funds, *unless the students are available.*

It is no longer true that it is difficult to enter medical school; or that only "A" students are admitted. Our medical schools are accepting one out of every two qualified applicants, and about two-thirds of the freshman students entering medical school have a "B" average. It is true that the high average student may find it easier to enter the school of his or her choice. There are many who do not have the real aptitude or desire for a medical career, and they must be informed of other exciting, stimulating and gratifying opportunities on the health team, such as physical therapy, occupational therapy, dietetics, medical records, medical technology, medical social work and so on. Here the physician has a golden opportunity to talk health careers to his young patients and their parents.

California is growing rapidly. It is estimated the population will increase another 10,000,000 between now and 1970. California does not now have enough nurses to meet the present demands for nursing service. The estimated need for additional hospital beds of all types is 47,972. To staff these additional hospital beds would require about 8,000 nurses. The number of graduations from Western nursing schools is not enough at present to replace the turnover. They will provide less than half the nurses needed by 1970 to maintain the present nurse-population ratio.

Informed estimates indicate that it would be possible and desirable to expand existing junior college and baccalaureate programs substantially if additional staff and facilities are made available. I have received many requests for information on the two-year program in nursing at junior colleges, or on the Associate in Arts programs. There are twenty Associate in Arts programs in nursing in California at present.

The two-year programs in nursing which lead to an Associate in Arts degree include courses in nursing, social, biological and physical sciences, communication skills and the humanities. Nursing comprises from one-half to two-thirds of the curriculums that have been developed.

In order that the shortened program in nursing be a sound one, the nursing faculty exercises great care in selecting and organizing the clinical experience so that it will relate closely with the theory in nursing.

The curriculum is planned in accordance with college policies and the regulations of the State Board of Nurse Examiners. Students graduating from these programs are eligible for the same state examination for licensure as registered nurses as are graduates from the diploma and baccalaureate programs.

The emphasis of the two-year program is on direct patient care, and graduates fit into the over-all organization of nursing care as registered nurses, giving patient-centered care in beginning general duty nurse positions. They have knowledge and understanding of the principles of good patient care. They have been assisted in the development of attitudes and skills that are felt to be important for the graduate nurse with beginning competence and are ready to begin developing the advanced skills of an experienced practitioner.

We are all aware of the great need for bedside nurses, and the opening of the programs will provide a new source of supply for this need. Two-year programs have also been attracting students who might not otherwise consider nursing as a career. In addition to young men and women who have just completed high school, women who are married and have children who are able to care for themselves have become interested in nursing. The age range of students in some schools goes up to the fifties.

According to the evidence from the beginning collection of data, these graduates of the two-year programs are as capable as graduates of three-year or four-year programs.

Physicians' wives have demonstrated their willingness to accept the challenge of helping to provide the health workers of the future. Mrs. Leonard Offield, previous Health Careers chairman, reports that last year the Woman's Auxiliary to the California Medical Association sponsored 158 Health Careers clubs and granted 75 loans or scholarships totaling $10,000. It has given $72,000 since the program was inaugurated.

MRS. FENIMORE E. DAVIS
Health Careers Chairman
Woman's Auxiliary to the
California Medical Association

NEWS & NOTES

NATIONAL · STATE · COUNTY

ALAMEDA

A grant of $5,000 to be used for a continuing **study on fat metabolism** of infants has been made to the Bruce Lyon Memorial Research Laboratory at Children's Hospital of the East Bay by the Gerber Baby Food Fund. Dr. Vasant S. Patil (Ph.D.), research fellow at the laboratory, is assigned to the research project.

LOS ANGELES

Dr. Adolph A. Kutzmann, associate professor of urology at Loma Linda University Medical School, Los Angeles, was installed as president-elect of the United States section of the International College of Surgeons at a dinner meeting of the executive council at the Lakeshore Club in Chicago on September 9, 1961.

* * *

A postgraduate course sponsored by the Council on Postgraduate Medical Education of the **American College of Chest Physicians** will be held at the Statler-Hilton Hotel, Los Angeles, December 4 to 8. This course, titled "Recent Advances in the Diagnosis and Treatment of Diseases of the Heart and Lungs," will cover the most recent developments, both medical and surgical, of this aspect of medicine. The faculty will comprise 85 distinguished specialists in the field.

* * *

Surgeons, graduate nurses and all related medical personnel are invited to the first of four 1962 sectional meetings of the **American College of Surgeons in Los Angeles,** January 29 through February 1. Headquarters hotel for the physicians' sessions will be the Statler-Hilton, and for nurses the Biltmore.

SAN FRANCISCO

Presbyterian Medical Center has just received a $274,000 grant from the National Institute of Health, Bethesda, Maryland, toward the **construction of a $600,000 basic research laboratory** with new facilities for cardiovascular and cancer research as well as for endocrinology and neurophysiology, according to Raymond L. Hanson, president of the Medical Center's board of trustees.

The new building is to be constructed as an integral part of the Medical Center, Clay and Webster Streets, San Francisco.

TULARE

Dr. Frank Clarke has been named winner of the 1961 Indian Achievement Award sponsored by the Indian Council Fire of Chicago.

In making the award to Dr. Clarke, a Walopai Mission Indian who practices medicine in Woodlake, the Council Fire explained that it is given each year to an American Indian who has "struggled to reach a definite goal and has succeeded."

Dr. W. W. Bauer, director of education of the American Medical Association, was the principal speaker at a dinner meeting in Chicago at which the award was presented to Dr. Clarke.

GENERAL

Medical Audits of Hospital staffs will be the topic of a one-day conference to be held at the Jack Tar Hotel in San Francisco, Wednesday, November 15, 10 a.m. to 5 p.m., and will be repeated in Los Angeles the next day, November 16 at the Huntington-Sheraton, Pasadena. The conferences, which are sponsored by the California Academy of General Practice, are open to physicians and hospital administrators. They will include presentations by Vergil Slee, M.D., Ann Arbor, Michigan, a leading authority on medical auditing; William Whelan, Esq., director of special services, California Medical Association; Stanley R. Truman, M.D., commissioner, Joint Commission on Accreditation of Hospitals; and Robert D. Burness, Jr., Esq., administrator of Mills Memorial Hospital, San Mateo.

A registration fee of $10, to include luncheon and reception, will be charged. A program and registration form may be obtained from the California Academy of General Practice, Department C, Room 900, 9 First Street, San Francisco 5.

* * *

The Western Society for Clinical Research will hold its fifteenth annual meeting at Carmel on Thursday afternoon, Friday morning and Saturday morning, January 25, 26, and 27, 1962.

Information regarding the meeting may be obtained from the secretary, Dr. Homer R. Warner, Latter Day Saints Hospital, Salt Lake City 3, Utah.

* * *

The American Thyroid Association, Inc. has announced the opening of competition for **the Van Meter Prize Award of $500** to the essayist submitting the best manuscript of original and unpublished work concerning goiter—especially its basic cause. The studies so submitted may relate to any aspect of the thyroid gland in all of its functions in health and disease. The award will be made at the annual meeting of the Association in New Orleans, May 9 to 12, 1962. Deadline for submitting manuscripts is January 1, 1962. Particulars may be obtained from the Association's secretary, Dr. Theodore Winship, 430 N. Michigan Ave., Chicago 11.

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The tenth annual convention of the **Pacific Coast Fertility Society** will be held at El Mirador Hotel in Palm Springs, California, November 9 to 12, 1961. Further information may be obtained from the Society's secretary, Dr. Gregory Smith, 909 Hyde Street, San Francisco 9.

THE PHYSICIAN'S *Bookshelf*

CLINICAL METHODS OF NEURO-OPHTHALMOLOGIC EXAMINATION—Second Completely Revised and Enlarged Edition—Alfred Kestenbaum, M.D., Lecturer, Formerly Associate Clinical Professor, New York University; Neuro-Ophthalmic Surgeon and Chief of Neuro-Ophthalmic Service, New York Eye and Ear Infirmary. Grune & Stratton, Inc., 381 Park Avenue South, New York 16, N. Y., 1961. 577 pages, $16.75.

The second edition of Dr. Kestenbaum's book on Neuro-ophthalmologic Diagnosis follows 15 years after his first edition. It is with considerable pleasure that we greet this expanded and modernized edition of a book which has become a classic in its field. Dr. Kestenbaum has revised every chapter but has maintained the general organization of his first edition. His chapter on neuroanatomy of the visual pathway has been greatly expanded to include not only a thorough review of modern visual and oculomotor anatomy but also a general survey of neuroanatomy as it pertains to neuro-opthalmological problems.

Subsequent chapters on the visual field, the optic nerve, the chiasm, the ocular muscles, supranuclear gaze mechanism, nystagmus, and pupillary phenomena have been completely revised and modernized. Throughout the book one recognizes the personal interest and observations of a man who has been a life-long student of neuro-ophthalmology. The value of this work is increased by the addition of a greatly expanded bibliography and by the specific comments of the author regarding the value of the various ocular signs and examination techniques in terms of his own experience.

This book is not a primer for the student but rather a thoroughly sophisticated clinical work which should be a valued possession of the neurologist and the ophthalmologist alike for years to come. It is well printed and illustrated. The bibliography and the index are outstanding. In fact, the format comes up to the standards of Grune and Stratton.

FREDERICK C. CORDES, M.D.

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YOU CAN PREVENT ILLNESS—Edward R. Pinckney, M.D., Former Assistant Editor of the Journal of the American Medical Association, and Director of the Comprehensive Medical Clinic at Northwestern University Medical School. J. B. Lippincott Company, East Washington Square, Philadelphia 5, Pennsylvania, 1960. 152 pages, $3.50.

This well conceived, brilliantly written and exceedingly readable little book was written primarily to tell people what they can do to stay healthy and help protect themselves and their families from accident in disease. No home remedies or self-prescribing is mentioned anywhere in this text. Stress is definitely on prevention and thus this becomes an outstanding contribution to public health and health education. The emphasis on education and prevention is readily understandable since the author has long been an outstanding specialist in preventative medicine.

The volume covers a wide array of subjects from immunizations, inoculations, and vaccinations during infancy and childhood to coronary disease in old age. Medical subject matter, usually difficult to describe, such as serum cholesterol values (one of the best chapters in the book), radiation, the measuring of x-rays, and the influence of stress on the human organism are explained in simple terms which are readily understandable and comprehensible to the average reader.

However, in this reviewer's opinion, the best chapter in the book is the last, written by the author's wife, Cathy. It deals with mental disease and its prevention. Cathy distinguishes between the real progress that psychiatry has made against neurosis and overt mental illness, and the harm that some analysts have done in sometimes imposing needless guilt feelings on patients. "There is too much needless guilt," says Cathy Pinckney, "suffered by the man who loses his house keys repeatedly, only to find months later that his child has been caching them away in the toy chest. He really does want to come home every night, despite what his wife, and her analyst say."

M. COLEMAN HARRIS, M.D.

* * *

CARDIAC ARRHYTHMIAS—A Guide for the General Practitioner—Brendan Phibbs, M.D., Casper Clinic, Casper, Wyoming. The C. V. Mosby Company, 3207 Washington Blvd., St. Louis, 1961. 128 pages, $7.50.

This small volume is designed as a simple primer to teach physicians who are not cardiologists to diagnose and treat cardiac arrhythmias. The material which the author has introduced is clearly described and illustrated and will be helpful to the general practitioner. There is insufficient detail and insufficient discussion of variants to be helpful to the experienced internist.

The text is accurate with a few exceptions, notably the following:

1. The author states that the most effective way of giving quinidine is to give a dose every hour for twelve doses and at the end of the twelve hours to check carefully for evidences of toxicity. There is no evidence of which the reviewer is aware that indicates that this is a more effective or safe method than when the drug is given at two to four hourly intervals. Further, the advice to check for toxicity after twelve hours suggests that it is not necessary to check before that time, whereas in fact the patient should ideally be checked before each dose.

2. The author recommends quinidine when ventricular tachycardia is the mechanism for Adams-Stokes attacks in complete heart block. This is generally considered to be unwise, and isuprel is preferred.

3. The author states that sinoatrial block is of no consequence. This is not strictly correct, since it often is the result of digitalis and may be the mechanism for Adams-Stokes attacks. Sinoatrial block may also occur during quinidine therapy.

In general, the clear text and diagrams will be helpful to those who want a short, "unsophisticated" account of the practical aspects of cardiac arrhythmias.

MAURICE SOKOLOW, M.D.

MANAGEMENT OF OBSTETRIC DIFFICULTIES—Sixth Edition—Revised by J. Robert Willson, M.D., M.S., Professor of Obstetrics and Gynecology, Temple University School of Medicine; Head of the Department of Obstetrics and Gynecology, Temple University Medical Center. The C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, Mo., 1961. 687 pages, with 323 text illustrations and one color plate, $16.50.

In this new edition of a book that has been available now for nearly a quarter of a century the name of Titus has been dropped from the title page and it now truly represents the new author's views and practices at the Temple University Hospital. As this reviewer noted in these pages when describing the previous edition, the title of the book has always seemed a bit misleading. Certainly it includes many subjects not generally thought of as "difficulties" in obstetric practice, and large segments of the text have nothing directly to do with management. Actually it is a modified textbook that lacks the usual basic anatomy and physiology of reproduction, but it offers a few extras such as an opening section on infertility and a concluding section on the newborn infant contributed by Vaughan and Laupus of the Department of Pediatrics in the Medical College of Georgia. The material in between is fairly standard information about prenatal care, complications of pregnancy, labor and puerperium, and the usual obstetric operations. It is very well written, nicely illustrated, and reads easily.

A considerable number of minor revisions have been made in order to include newer concepts that have become fairly well established in the last decade. These relate to such things as the incompetent cervix, prediabetes, use of diuretic and hypotensive agents in pregnancy, and fetal electrocardiography. Other material has been deleted, many inferior illustrations have been replaced by better ones, and the length of the volume has been cut by 50 pages. Finally, it has been completely reset in a most attractive new typographical format that will cost the buyer only one-third more than the previous edition.

The author says this book is intended as a reference for practicing obstetricians and residents, emphasizing practical and useful procedures, rather than a general text for students. Whether it is a better investment than one of the standard textbooks is a question with different answers for different people, and your reviewer chooses not to sit in judgment.

C. E. McLennan, M.D.

* * *

CHILDBIRTH WITH HYPNOSIS—William S. Kroger, M.D. Edited by Jules Steinberg. Doubleday & Company, Inc., 575 Madison Avenue, New York 22, New York, 1961. 216 pages, $3.95.

This book seems to be based on concepts regarding pregnancy and childbirth which are of increasing acceptance in enlightened medical circles, such as: (1) With relatively infrequent exceptions, the common discomforts and dysfunctions of the pregnant women in our Western culture arise from conscious and/or unconscious irrational fears and emotional conflicts related to femininity, pregnancy, childbirth, motherhood, etc. (2) Pharmacological relief of these symptoms, especially general anesthetics and sedatives during labor and delivery, can be within safe limits for the mother but produce crucial and permanent damage to the baby. (3) The willingly conscious active participation of the mother in the delivery of her baby can be a beneficial experience for her in a very personal and gratifying way, and also benefits the on-going important mother-child relationship.

The application of these concepts to obstetrics has produced a great variety of "methods" such as the Read Method of Natural Childbirth and the Psychoprophylactic Method in the Soviet Union. These "methods" and their many variations differ primarily according to the individual doctor's understanding and orientation towards the relative importance of the conscious and unconscious emotional and psychic factors in the experience of labor pains and other discomforts of pregnancy and his techniques for dealing with these factors.

This book emphasizes the usefulness of *hypnotic* techniques in reducing the pathogenic irrational emotional and psychic factors in the expectant mother, reducing the amount of chemical anesthetics, analgesics and sedatives and enriching the entire experience for the mother.

Dr. Kroger's apparent goal is to have his patient come eagerly to labor, free of fear and in an hypnotically induced state of mind and body in which the patient is consciously aware and cooperative throughout the labor and delivery. He does *not* advocate an hypnotically induced amnesia for the pains. By the time she reaches labor the several months of psychotherapy, using hypnotic techniques, have actually altered her emotional reaction to the "pains." Instead of being frightening and unbearable, the pain stimuli are welcome indicators of an immensely gratifying experience. How successfully does he achieve this goal? His statistical references vary but at one place he says, "We have delivered several hundred mothers by either pure hypnosis or a combination of hypnosis and chemoanesthesia. About 20 to 25 per cent of these patients . . . were carried through the first and second stages of labor without analgesia or anesthesia. Fifty per cent of all our patients required only minimal amounts of sedation, usually near the end of the first stage. Local anesthesia was used for the episiotomy and repair. Even if you consider the remaining 25 per cent—and remember that this smaller group includes abnormal labors—failures, hypnotically speaking, of course, the results are still worth the effort. *All* of our patients benefit, to a degree, by learning about hypnosis, because they are better equipped to face the emotional trials of motherhood."

In overall style, this is a strange book authored by an M.D. and "edited" by an editor and writer for "trade publications." The cover is ostentatious and uncomfortably superlative regarding the contents. It is not a medical book. It is openly written to "you"—the expectant mother—who "deserves to be told everything that science is doing to protect her health and that of her child during childbirth."

He goes into great verbatim detail reporting his hypnotic and auto-hypnotic techniques and suggestions. So much so, that it frequently gives the impression of a do-it-yourself manual. He then warns the reader against using any part of the techniques without complete supervision and advice of a competent M.D. He includes many impressive testimonial letters from appreciative and enthusiastic patients. His general and more specific treatment of the subject of hypnosis has some merit but, as repeatedly recurs throughout the book, there is a kind of shallow glibness which is a distraction to a scientific minded reader.

His advocating the use of hypnosis as an adjunct to exploratory, uncovering psychotherapy is deceptively pat. He inadequately stresses the degree of specialized training and supervised experience that a conscientious doctor would insist upon before attempting the depth of psychotherapy Dr. Kroger seems to be claiming for his methods.

Anyone unfamiliar with the use of hypnotic techniques in general and specifically in obstetrics could find some enlightenment in this book, but if he is seeking an authoritative scientific understanding of modern theory and practice of medical hypnosis he should look elsewhere to augment this peculiarly directed book.

Mehl McDowell, M.D.

PHARMACOLOGY—The Nature, Action and Use of Drugs—Second Edition—Harry Beckman, M.D., Chairman, Departments of Pharmacology, Marquette University Schools of Medicine and Dentistry; Consulting Physician, Milwaukee County General Hospital and Columbia Hospital; Editor, Year Book of Drug Therapy. W. B. Saunders Company, West Washington Square, Philadelphia 5, Pa., 1961. 805 pages, $15.50.

This enlarged and thoroughly revised edition of a textbook by a skilled medical writer and learned pharmacologist should be widely received. It promises to be the successor to the encyclopedic Manual of Pharmacology of Torald Sollman, also published by the W. B. Saunders Company, and which went through eight editions. Although in his preface Dr. Beckman infers that his book is intended to give the medical student the information in abbreviated form, this second edition is already as large as Sollman's earlier editions.

Much to the regret of the reviewer, Beckman, like most other textbook writers, continues the practice of placing principles in the first part of the book. Teachers will do well to leave most of the subject matter of his Section I, "A Justification of Pharmacology and Pharmacologists" and Section II, "Some Pharmacologic Background," until the class members, through a study of Section III, "The Actions and Uses of Drugs," have sufficient specific information for the understanding of "principles." In other words, the pedagogic principle of going from the specific or concrete to the abstract should be followed. However, Professor Beckman possesses such a sense of humor and such literary skill that an introductory Section I, Chapter I, written by him at once holds the reader's attention, though he may know little about drugs at the time, while the average textbook writer would have had difficulty making his point clear without much detailed knowledge already possessed by the student.

Section II is made up of twelve chapters on such general topics as "Clinical Effects Achieved with Drugs," "The Nature of Drug Action," "The Fate of Drugs," and "Legal Control of Drugs." Even Dr. Beckman's interesting style is not sufficient to prevent bewilderment of the student who still does not know one drug from the other, with the possible exception of those referred to in his preceding courses of biochemistry and physiology, namely the neurohormones and strychnine. This is especially so for Chapter 11, "The Prescription." The teacher would be wise to introduce the student to pharmacology by plunging into the subject at Section III, Chapter 14, "Drugs That Stimulate Uterine Muscle" and as the occasion permits and demands, develop the principles which the author so ably discusses in his first two Sections.

Section III is well arranged for pedagogical purposes. The first division is entitled "The Pharmacology of Muscle" and is made up of nine chapters, beginning with drugs which stimulate or depress the smooth muscle of the uterus, then cardiac muscle drugs are discussed and finally the skeletal muscles. The intent is obviously to describe drug action in relation to a single type of tissue, namely muscle, without the complication of nerves. This cannot really be done, since as shown in his Chapter 19, the principal drugs affecting skeletal muscle act either at the neuro-muscular junction or on the spinal or higher central nervous system reflex structures.

In the next division, "The Pharmacology of Blood," four chapters are devoted to drugs having effects on circulating plasma or cells or their precursors, and avoids the nervous system more successfully. Then, beginning with Chapter 27 of the division entitled "The Pharmacology of the Blood Vessels," the autonomic nervous sysem as well as the muscle (or gland) becomes involved, leading up to "The Pharmacology of the Central Nervous System" with its eight chapters and 170 pages. Then the author returns to "The Pharmacology of the Autonomic Nervous System" with its seven chapters comprising 60 pages. Then follow the divisions on drugs altering function of the kidneys, liver and gallbladder, gastrointestinal tract, infection, enzymes and hormones, vitamins, electrolytes and 12 chapters on miscellaneous topics.

Whatever may be the faults of organization for pedagogic reason (and the reviewer recognizes that his own opinion is not generally accepted by textbook writers), there is little to criticize in choice of material or in accuracy of statements Dr. Beckman has long experience in writing with the view of aiding the practitioner in the choice and use of drugs. He has few peers in his ability to write interestingly, yet with superb scholarship, about so difficult a subject.

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BONE CHANGES IN LEPROSY—Vilh. Möller-Christensen, M.D. Ejnar Munksgaard, International Booksellers and Publishers, Ltd., 6 Norregade, Copenhagen, Denmark, 1961. 51 pages, no price.

It is probable that most American doctors, even though they have never actually seen a leper, are vaguely familiar with the horrible deformities and spontaneous amputations which may result from leprosy. According to author Vilhelm Christensen, the number of lepers in the world is steadily increasing, there now being some 12,000,000 as compared with 7,000,000 in 1953. Dr. Christensen is a Danish general practitioner, and apparently became interested in leprosy through his excavations of certain church graveyards, where, during medieval times, a large number of leprous individuals were buried. His interest in this subject has extended over many years and the excavated material now embraces some 358 specimens, 123 of which are complete skeletons. In addition to this, his experience includes study of living lepers in various leprosaries in the Far East.

In Chapter One of the book he describes a new symptom complex, the "facies leprosa," defined as atrophy of the nasal spine, loosening and loss of the central incisors, due to atrophy and destruction of the maxillary alveolar process.

Chapter Two describes the various leprous lesions encountered in the nose, mouth and eye, while Chapter Three contains a description of the gross pathological changes observed in the osseous system, both in living patients and in the excavated skeletal remains. Over 90 per cent of the 123 complete skeletons exhibited pathological changes observed in the skull, there being atrophy of nasal spine in 70 per cent, atrophy of the maxillary process in 60 per cent, and evidence of inflammatory changes in the superior surface of the third palate in 90 per cent. Ninety-nine showed typical amputations, ankyloses, twisted fingers, etc. of the extremities, characteristic of neurogenic leprosy. These lesions are all well and profusely illustrated. One of the most interesting pathological changes was observed in the tibiae of some 25 of the skeletons. Their lateral surfaces are veritably corrugated, there being alternating ridges and furrows apparently created by the deposition of a number of long ridges of new bone running parallel to their long axes.

Anyone interested in the history of medicine can spend a pleasant hour reading through this well organized and concisely written little book. It contains only 48 pages of writing and some 15 pages (112) illustrations. It will obviously be of great value to that limited group of physicians who actually care for leprous patients. There is much of interest to the otologist, the roentgenologist and especially the orthopedic surgeon.

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